THE MONTHLY

Review

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A Tribute to Electroplaters

By MAURICE R. CALDWELL

THE UNITED STATES has reached its production goal in approximately three years, one year of preparation and two years of war. The enemy required more than ten years of development and conquest. This achievement is a triumph for our industrial, research and technical organizations. It is also a tribute to our people's cooperativeness by exchanging the "know how" resulting from years of private research.

During this period electrochemists and platers have, in many cases, been expected to be a master of all trades. We all appreciate the value of new experiences with new processes but such diversification has in many cases taxed the technician to the limit. For example, it has not been uncommon for one factory to be using many or all of the various coatings simultaneously. The most common applications have been, hard chromium plating for wear, porous chromium for special wear requirements, anodizing of aluminum, chromate pickling of both magnesium and aluminum, cadmium and zinc for rustproofing, silver for bearings, copper to stop off carburizing, tin to stop off nitriding, phosphate coatings of various types and tin for mess kit parts.

Yes, a tribute is due the technical man whether it apply to finishes or some other art. He has used his ingenuous ability to coordinate the experience of the past with the various metals, chemicals, etc., and apply them to the necessities of war. We all hope that these instruments of war will do the job intended when the crucial time arrives.

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Yesterday - Today - Tomorrow

By E. T. CANDEE

ITH the changes listed in the article printed in the April *Review*, it seems well to scrutinize the status of the Society and its mode of operation today. Taking the various points as they were outlined in the previous article, we will show the progress that has been made in two years.

1. Publication of Periodicals

Publications of the National Society fall into three classes: (1) publishing of the *Monthly Review*, (2) publishing of the Convention Proceedings, and (3) publishing of books. At the time Mr. Bain was appointed Advertising Manager, the *Review* averaged 84 pages per issue and ran consistently between 80 and 92 pages per issue. The advertising income from the *Review* was between $10,000 and $11,000 a year. At the present time the *Review* is running uniformally at 100 pages per issue; this limitation strictly due to the paper situation and not due to the lack of editorial material or advertising. The advertising income for this fiscal year will approach $30,000. The *Review* has been modernized in layout and the front cover has been changed in accordance with modern design. A book review section has been added which serves to keep the members informed as to the newest books published and also serves as a simplified method of the purchase of the new books by members. Other features added have been the new patents section and a more thorough coverage of the periodicals in the review section. One series of articles by Dr. Samuel Glasstone was published and completed, and a second series is now being printed each month. When the time comes that the amount of paper used can be increased, the *Review* will expand its facilities even more to render greater service to the members.

The Convention Proceedings have been published in accordance with past practice with gradual increase in the quality of printing and accuracy of verbal reportings. This project is handled largely by our public stenographer, Miss Marquardt, and many other suggestions which have been adopted have come from her. The Executive Committee is considering publishing the Proceedings in a standard book form with hard covers rather than the original form which has been used in the past, as it is felt that this will fit into the standard libraries better than the present Convention Proceedings.

The newest effort in this line is the publication of a book by Dr. Samuel Glasstone. This was a revised version of the series of twenty articles printed in the *Monthly Review* and the sale of these books has been very gratifying; in fact the book is now being reprinted to meet the demands of various libraries, schools, and individuals. The Executive Committee feels proud that several colleges are anticipating the use of this book as a text on electrochemistry for undergraduate classes. The use of the book for this purpose

not only increases the income of the Society but also broadens the knowledge of the Society among students who may later become affiliated with the plating and finishing industry. The Executive Committee now anticipates publishing a series of books on various phases of electroplating of the same size as the first book, published in such a form, that they will be readily available to all members of the Society and others who are interested in the science of electroplating. Publication of such books is one of the duties of a scientific society and it is our feeling that by doing this we are further fulfilling our duty as a Society.

2. Membership Records

It has always been a difficult problem to maintain the records of the Society in good condition. All records of the National Office are sent in by branch secretaries and in many cases changes of status, changes of addresses, etc. are not sent to the National Headquarters as they occur. It was found that the membership records of Mr. Kennedy had many names which should have been deleted and in many cases members were not receiving their Review although they were in good standing. A start was made to correct these records while Mr. Kenney was Executive Secretary. For the last two years it has been the practice of the National Headquarters to send a list of all members to each branch secretary once a year for his verification. In this way the errors that have come up during the year are corrected, and we feel confident that the membership records are in the best shape they have been heretofore. The maintenance of membership records requires considerable time at the National Headquarters because of the change of status of members, election of new members, resignation and suspension of members and changes in addresses. It may be of interest to the Society to know that each month there are 50 or more changes to be made in the records and many of these changes require considerable time to check because the information concerning them is not available.

3. Liaison Between Various Branches

As our Society is set up, each branch is a separate organization and many times it is difficult to straighten out misunderstandings between branches. One of the greatest sources of difficulty is in transfers. Under the present procedure, a man desiring to transfer from one branch to another asks his secretary for a transfer and then it is up to the member to hand the slip to his new branch secretary. Many members do not realize the importance of turning the slip over to the new branch secretary and it requires continual scrutiny of transfers and careful checking to make sure that when a man is transferred from one branch to another he is properly accredited to a new branch.

4. Financial Stability

Due to the amount of work carried on by the National Headquarters and the cost of publishing periodicals and books, it is essential that the National Society have adequate capital to carry on these duties. The budget of the Society for the fiscal year just completed was $35,000 and the budget for the subsequent years will

increase as the income increases. The budget for this year showed a substantial balance at the end of the year which will be added to the funds of the Society. Preliminary estimates indicate that this balance will be between $8,000 and $10,000. This increase which is far greater than that of any previous year we feel is due to the increasing income from advertising and from a greater number of members as well as from economies affected in the operation of the Society. If the financial balance of the Society increases so that it is a safe level, the Executive Committee feels that the Society should furnish more support toward the operation of the research work than it has in the previous years. If the Society can continue to operate as it has in the last two or three years, we feel confident that the financial status of the Society will be considerably improved and thereby will be in a position to do more for its members.

5. Alertness to Trends of the Industry

The Executive Committee feels that another duty of the Society is to maintain an alertness to trends of the industry. War time priority information has been disseminated as it has become available which has been of assistance to those who have to procure materials. The establishment of a patent review section and a more complete coverage of the literature of the industry keeps the members informed of new things.

Concerted effort has been made to publish information on new processes as they are announced; the limitation on information that can be published under present day conditions is chiefly for national security reasons. There are many processes which have been developed during the war which will be described in the *Review* as soon as the Government Bureaus will permit. Publication of books and the revision of these books as new material is available is another method of keeping the members up to date and requires alertness on the part of the Executive Committee.

6. Research Work

The Research Committee has not been able to function for the last two years because of war work. However, the Research Committee has continued correspondence and has formulated tentative plans for future work which they propose to start after discussion with the Society at large. The Research Program carried on by the Society is one of its most important functions and the Executive Committee considers one which should be encouraged in every way possible. It is the sincere hope of the Committee that the work can be started again in the near future and carry on as it did before the war.

With the above review of what is being done today and a few indications of some of the plans of the Executive Committee, it is felt that the members of the Society can appreciate what is being done and also can appreciate the amount of work undertaken and carried on by the members of that Committee.

This series of articles will be continued in future issues of the *Review* and each of the functions will be described in greater detail. The Executive Committee believes that the American Electroplaters' Society is a group of members all of whom have an equal part in the Society and an equal interest in its successful operation.

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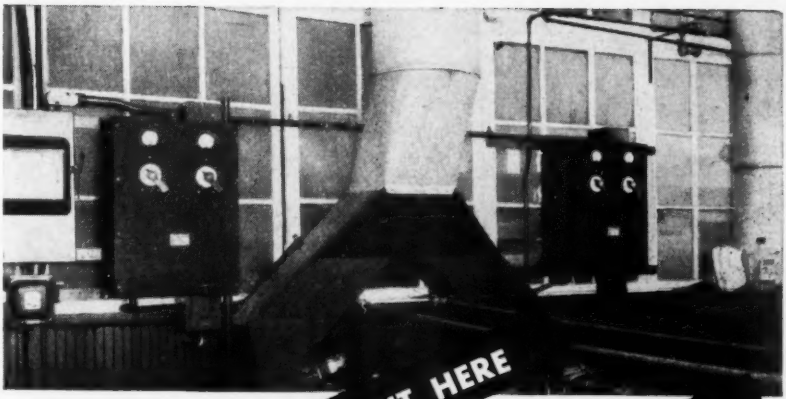

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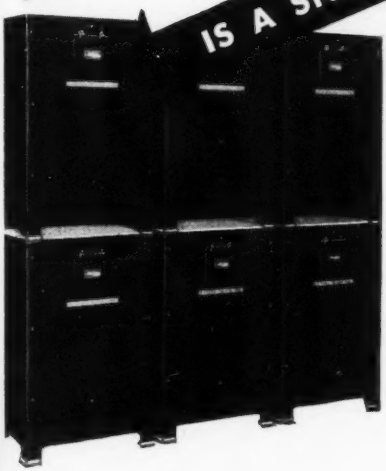

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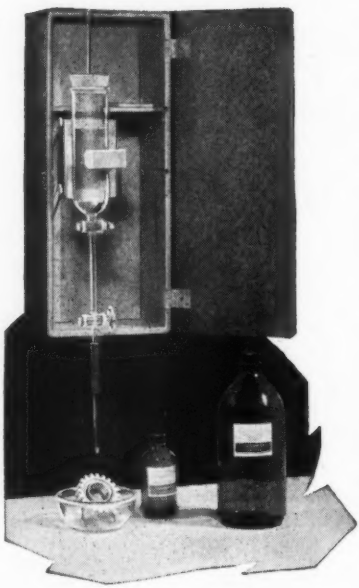

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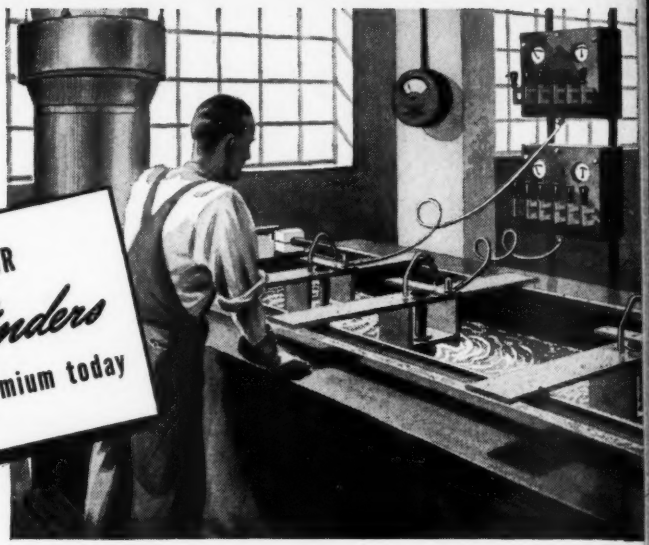

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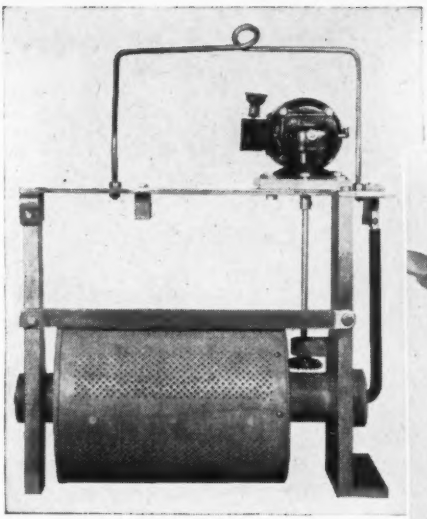

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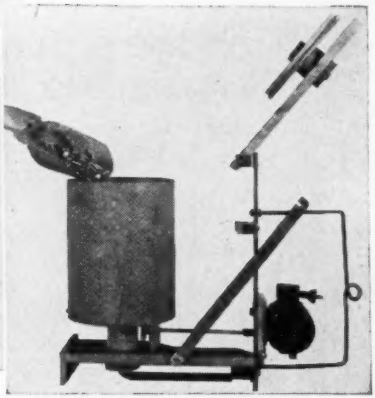

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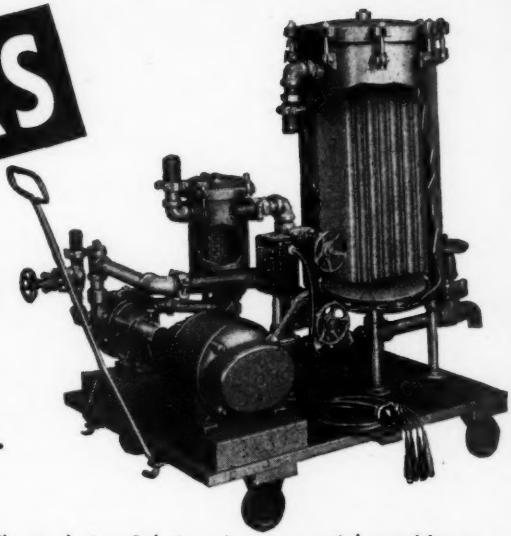

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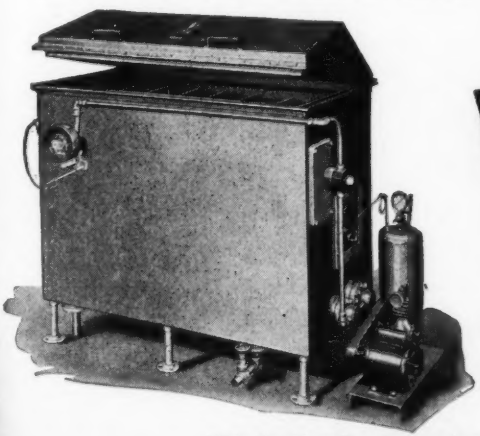

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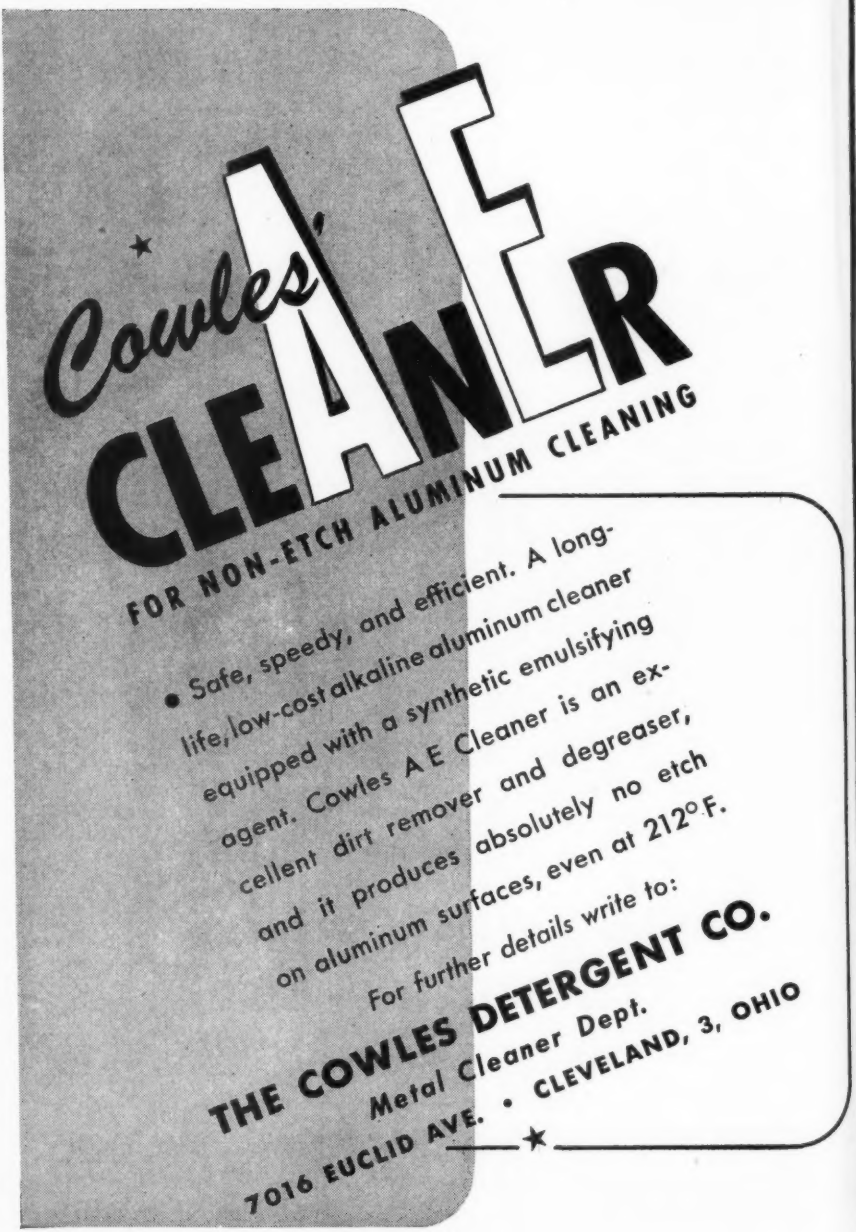
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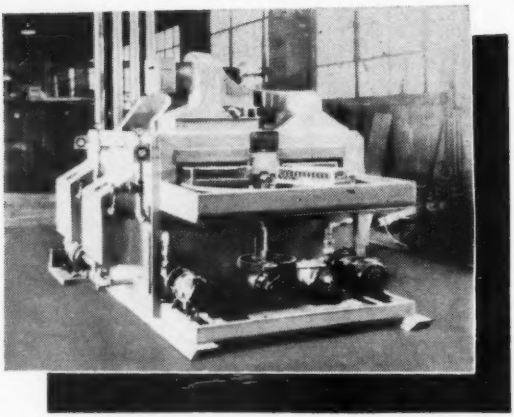

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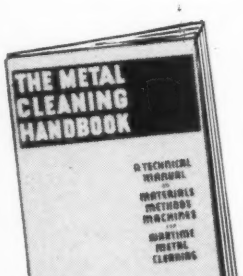
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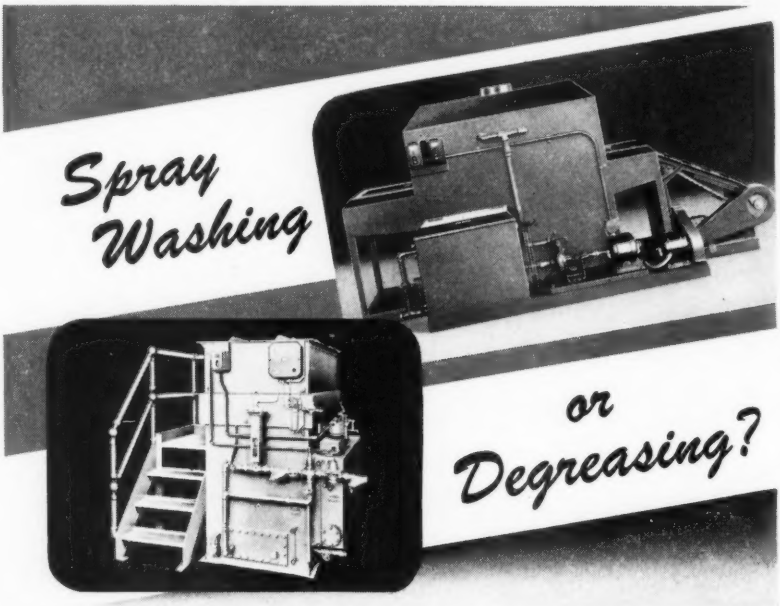

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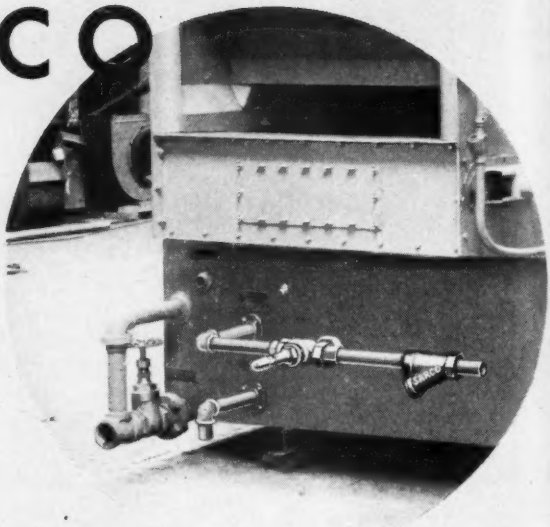

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A Thought to Aluminum

By ARTHUR R. McNEIL

IN the years since Pearl Harbor, almost miraculous expansion of the nation's Aluminum production facilities has taken place. The stock pile of this metal, which in the early days of the war was at a dangerously low level, is now many times greater than was ever thought possible and, is still growing. This is in spite of the increased demand for Aluminum by our Armed forces and those of our allies. The exact figures of the present day production of Aluminum would amaze the ordinary person.

When we realize how grave the situation was two or three years ago, we certainly can be proud of American ingenuity and grateful to our Nation's number one and number two Aluminum producers; The Aluminum Corporation of America and The Reynolds Metals Compaiy.

We all know that Aluminum is the most abundant of all metallic elements. However, up to a few short years ago, there were but few bauxite deposits in this country that were workable, economically, for a deposit was considered poor if it contained more than seven per cent Silica and less than fifty-five per cent Alumina, (Alumina is the fine, white powder that is the basis of Aluminum metal). In 1941 the Reynolds Metals Company Engineers developed a process for converting the nation's low grade ore into the purest Aluminum. Ore containing as high as fourteen per cent Silica and as low as forty per cent Alumina was, therefore, made available for use. This one fact alone was in no small measure, responsible for the phenomenal growth of our Aluminum reserves.

It is difficult for the person who has no contact with the Aluminum industry to realize to what extent we have progressed toward developing new and novel uses for this all-important metal. We are inclined to associate it strictly with aviation, cooking utensils and refrigerator parts. True, because of its lightness and durability, we find its most important use in Aircraft. However, these two virtues, plus many more, make it the ideal metal for many, many useful purposes.

After the war, when as before, we are not concerned solely with absolute necessities, and we can concentrate more on the things that make life a little more pleasant, we shall find that Aluminum has taken a definite place in the scheme of things. Dresses and gowns of beauty, stockings as sheer as silk, ladies' handbags and men's transparent bill-

folds, draperies and curtains of exquisite design and texture, washing machines of solid Aluminum that can be moved around with ease, carpets and rugs, lampshades and bedspreads, all from Aluminum, are not mere possibilities, they are distinct probabilities.

With these facts in mind, it is well for every plater to seriously consider the part he may be asked to play in the Finishing of Aluminum. Regardless of the uses to which it may be put after the war, Aluminum must be treated and finished, just as any other metal must. It must be further protected against corrosion. It must be made attractive, and in some cases, new properties will have to be added to its surface by Electroplating. In the blending of Aluminum with materials such as plastics, dyeing and coloring will be essential.

No doubt many new finishing techniques will be developed in the coming years, but before the pressure of production bears down upon us, let's give a little thought to the Finishing of Aluminum under present day methods. We don't contend that this article covers all there is to know about the subject but, we hope that it will at least, stimulate a little serious thought in the right direction.

Many articles and papers have been released covering the Technical aspects of Aluminum Finishing, and can be referred to by anyone so desiring. In this article we will refrain from discussing the technical phases and attempt to put this subject forth in language that every plater, the men at the tank and the newcomer, will readily understand.

Aluminum is a soft, very active metal. It will absorb foreign substances and contamination very readily and will react, in the presence of oxygen, to form an oxide film, on the surface, which is detrimental to the deposition of electroplated coatings. For these reasons, three steps are necessary to successful finishing. (1) Proper surface preparation. (2) Finishing as quickly as possible after preparation. (3) Applying a coating as dense and as pore-free as possible, to avoid contact of the Aluminum with oxygen through the pores of the coating.

Finishing of Aluminum can be broken down into five separate classes. (1) Mechanical. (2) Chemical. (3) Electrolytic oxide. (4) Electroplated. (5) Organic. Any one of these types may be applied for its own particular purpose or, as in most cases, two or more of these may be grouped together to produce a combination of results. This may be illustrated by the process of Anodizing and then dyeing or painting, where mechanical smoothness, corrosion resistance, and attractiveness are the results looked for.

Mechanical finishes include:

1. Polishing and Buffing.
2. Sandblasting or Sandrolling.

3. Scratchbrushing and Greaseless finishing.
4. Tumbling and Burnishing.

Inasmuch as most platers are familiar with Polishing and Buffing procedures, as applied to soft metals, this requires no special consideration. Sandblasting is a problem best handled by the individual jobber. Scratchblasting and Barrel Burnishing, on the other hand, can be given a little thought.

Many pleasing effects may be created on Aluminum, by scratchbrushing, simply by altering wheel speeds, wire diameters, wheel sizes and wire composition. If a rough, coarse-lined finish is desired, a wheel speed up to 1750 R.P.M. may be used, with a 6″ wheel, having a wire diameter of .015 to .020. If finer, close-lined finishes are looked for, they may be obtained with a 6″ wheel, or smaller, having a wire diameter of .002 to .005, at a wheel speed of from 450 R.P.M. to 700 R.P.M. Steel wheels will give a more lustrous finish than brass, but will take off more metal than brass, at the same applied pressures, and have a tendency to drag unless handled properly. Perhaps the most important consideration here, is cleanliness, both of work and wheel. The article should first be cleaned of oils, greases and contamination. The wheels used must be kept clean with occasional applications of lump pumice rubbed across the face of the wheel while it is in motion. Steel wheels which show signs of rust should be pickled and dried thoroughly before using. When these wheels are to be left for any length of time without being used, they may be dipped in a rust-inhibiting oil, and of course, again cleaned before using.

Barrel tumbling and burnishing is probably the least expensive of all finishing procedures, because of the volume of work which may be handled at one time. It is also the most sorely neglected, probably because not too many platers realize the excellent results that may be obtained with the use of this method. Finishes ranging from dull matte to bright gloss can be obtained, depending somewhat on the burnishing material used. A water and powdered pumice solution will produce a dull satin effect. This procedure is quite abrasive to the Aluminum and care must be exercised to avoid over-burnishing. Some of the pumice becomes imbedded in the surface of the metal, and for this reason, this process should not be used prior to electroplating.

Tumbling in steel shot, of various shapes and sizes, using a soap and water solution as a lubricant will produce a fairly bright, semi-gloss effect. In this method a wood lined barrel is used. Two parts shot by volume and one part work, with enough water to cover both, gives satisfactory results. Approximately two thirds of the barrel

should be utilized, allowing one third for free space and rolling motion. This may be modified to meet special requirements. Rolling time depends upon the surface condition of the metal and finish desired, and the construction of the barrel. Where the articles are to receive no further treatment, such as anodizing or electroplating, a smooth, bright, fairly corrosion resistant finish may be had by first tumbling in steel shot, burnishing in hardwood sawdust, for about one hour, then tumbling in sawdust impregnated with a good grade of clear wax. Here again, cleanliness is a very important factor.

Each of the mentioned operations, or any others, require special consideration, relative to each particular job. Alloy composition, pretreatment, surface condition of the metal and proposed after-treatments will all have an influence on the platers choice of the operation to use.

Chemical Finishes include:

1. Frost finishing by etching in a caustic soda bath of about 15 per cent, at a temperature of 180°F. for about one minute and then immersing in a solution of two parts nitric acid and one part water. This produces a frosty white, pleasing appearance to the surface. The caustic soda bath may be brought up to boiling temperature, for accelerated etching, but, at higher temperatures has a tendency to leave dry caustic soda stains that are extremely difficult to remove. It is good practice to maintain as low a temperature as is consistent with a good etch and rinse as quickly as possible in clean cold water. In the case of high silicon alloys, the smut produced by the caustic bath may be completely removed by adding Hydroflouric acid to Nitric acid. Three parts concentrated nitric acid to one part hydroflouric acid. This dip must be operated cold, as warm HF dips will cause an objectionable yellow film which is almost impossible to remove without over-etching the Aluminum.

2. Black metallic oxide finish on Aluminum by immersion in proprietary solutions.* In this process, a rich black, fairly corrosion resistant finish is imparted to the work, which is an excellent base for further organic finishing. Various shades and appearances may be obtained by first finishing the article with one or more of the Mechanical finishes.

3. Transparent, blue-gray or green-gray coatings by immersion in a proprietary solution. This finish is also a good base for further organic finishing, and using one or more of the

*Ebonol A and Z Enthone Co.

Mechanical finishes prior to this process will produce a variety of effects.**

Electrolytic oxide finishing involves the conventional anodic treatment, whereby an aluminum oxide film is produced in electrolytes of either sulphuric acid or chromic acid. These films are exceptionally hard and durable, very highly corrosion resistant, have great dieletcric strength and possess good absorptive properties for dyes and paint finishes.

Sulphuric Acid Method. (Aluminum Corporation of America patent.) The solution concentration ranges from seven per cent to twenty-five per cent by weight of Sulphuric acid, depending on the type of film desired. The higher concentration will give softer, more absorptive films, and the lower concentrations will give harder, less absorptive films. Voltage used is from 12 to 21 volts. Temperature is maintained at 80 degress F. plus or minus 5 degrees. Time of treatment is from fifteen minutes to one hour depending upon the alloy being treated and the film desired. The thickness of film obtained is, in great measure, determined by the length of time of treatment. Various stages of grey color can be had by adjustments of temperature. The film obtained by this method may be readily dyed to a great many shades and colors. They are not entirely light-fast and for this reason should not be applied to articles exposed to direct sunlight, but, for indoor use are quite substantial. Formulas for these dye solutions can be obtained from many finishing magazines.

CHROMIC ACID METHOD

In this method a chromic acid electrolyte is used ranging from three per cent to ten per cent, at a temperature of 95°F. plus or minus 4°. Many platers prefer to start with a three per cent solution, making periodic additions of chromic acid until 10 per cent is reached. The reason for this lies in the fact that less Aluminum is dissolved at the lower concentration and by making the periodic additions, more time elapses before it becomes necessary to discard the solution. The voltage used is 40 volts. Usually the load is started at low voltage and raised in slow stages until the maximum is reached. The cycle is then continued for thirty minutes to forty-five minutes. In the case of alloys high in silicon, fifteen minutes seems to be sufficient, as it is doubtful whether any thicker film can be obtained by longer treatment.

The PH range is from .1 to .8, with the three per cent solution having somewhere near the higher value and the ten per cent solution having the lower value. When the solution has a PH greater than

**Alrok Process Aluminum Corporation of America.

0.8, it should be discarded, or some of it taken out and replaced by a new solution. With the allocations in effect on chromic acid, at the present time, the latter practice is preferable. Under optimum conditions, films produced in the above PH range will be of a quality necessary to pass the 200 hour salt spray test. If the PH rises above .8, the film tends to become thinner and it is doubtful if these films will withstand the test.

While this type of film is not so readily adaptable to coloring in dye solutions as the sulphuric type, there are, however, numerous dye baths which will produce such colors as red, blue, green, yellow, brown, and various shades in between. The surface preparation prior to anodizing, the porosity of the anodic film and the color of the film, all have an influence on the final dyed color. Here again, a knowledge of the Mechanical and Chemical Finishing of Aluminum is of importance.

In some cases, where different alloys are to be used in the same assembly, it is necessary to treat each alloy differently before anodizing, in order to obtain uniformity of finish between component parts. The writer recalls one such case. One article had to be cleaned in the conventional manner and then anodized, another had to be sand-blasted very carefully and then anodized without any further preparation, and still another had to be given the frosted finish. All this was necessary to obtain a uniform finish throughout the final assembly. Many such problems can be solved by using one or more of the Mechanical or Chemical finishes, alone or in combination, prior to anodizing.

The cleaning cycles for both the sulphuric acid and chromic acid methods are identical. The following steps should prove satisfactory in most cases but may be modified wherever necessary.

1. Solvent clean. Immersion or vapor.
2. Immersion in a mild non-ferrous alkaline cleaner.
3. Rinse well in cold water.
4. Dip in 2 to 1 nitric acid.
5. Rinse well in cold water.
6. Anodize.

An alkaline cleaner designed for Aluminum should be used, to avoid unnecessarily etching the surface. This is particularly true in the anodizing of a buffed surface or one where the recesses are polished and the highlights color buffed. Some platers still clean in a caustic soda solution. Where etching of the surface is not objectionable, this procedure is all right. However, there seems to be no real advantage attached to it, and inasmuch as the mild type cleaners do the job, it is wise to avoid etching as much as possible.

The sealing operation after anodizing is also the same for both the sulphuric and chromic baths. If a clear film is desired, the seal may be accomplished in boiling water for about 30 minutes. This water should be kept thoroughly clean, as the film will readily pick up surface contamination. If slight stains are not objectionable, or if for purposes of identification, as is the case of lot handling of rivets and bolts, a yellow color is desired, the seal may be accomplished in a five per cent solution of sodium or potassium dichromate at the boiling temperature. Here again, high silicon alloys are an exception to the rule. These alloys, in all probability, will remain a dark, smutty grey.

ELECTROPLATED FINISHING

It is not only possible, at the present time but, quite practical to apply electroplated coatings to aluminum. Such coatings as copper, nickel, silver, cadmium, zinc, chromium and Tin, may now be applied to Aluminum with comparative ease. The trick seems to be in applying a coating prior to plating that will retard the usual oxide formation and will be of sufficient, microscopic, roughness to insure adherence of the plated coating. There are a number of proprietary solutions on the market that work well in this respect.* These solutions produce, by immersion, a film, probably zinc, which is very uniform and quite adherent.

Once again, surface preparation is of vital importance. Here too, the use of an alkaline cleaner that has a low rate of etch is advantageous. Attack of the surface of the Aluminum article should be avoided as much as possible, particularly on finely finished surfaces. The usual two to one nitric dip may be used after the alkaline cleaner and, in the case of alloys high in silicon, complete smut removal may be accomplished in the usual nitric-hydroflouric dip.

The plating of sand castings of Aluminum appear to present the most difficulty. When working on these castings, the acid dips should be eliminated whenever and wherever possible. To make this possible it is absolutely essential to use a mild non-ferrous alkaline cleaner that will leave the minimum amount of smut on the surface. After the work is pre-treated, it should be transferred to the plating solution and current immediately applied. It is advisable to have the current going onto the work when it enters the solution as is sometimes done in silver plating.

In some instances, such as tin plating from the stannate bath and zinc plating from an acid bath, a preliminary coating of cadmium can be applied and then the work transferred to the final plating bath. All

*Enthone Co., Colonial Alloys Co., Krome-Alum Corp., Aluminum Corp. of America.

in all, after a little experimentation, the plater will find himself rather adept at the electroplating of Aluminum.

ORGANIC FINISHING

This type of finishing does not require too much discussion. Cleanliness and the selection of the proper priming coat are the two prime requisites. Any number of good top coatings may be successfully applied if the primer coat adopted is of the right quality. Zinc chromate primers appear to give the best all-around results, because they possess the necessary corrosion resistant properties and afford a good bond for the finish coat. As previously mentioned, the anodic films provide an exceptionally suitable base for organic finishes. Where anodizing is impractical and specifications permit, the aforementioned Chemical Finishes will prove adequate.

Cleaning may be done in a solvent immersion cleaner or by vapor degreasing, followed by an alkaline cleaner containing a suitable inhibitor. The vapor degreasing method has an advantage over the immersion, because it drys rapidly and leaves a surface free of the oil film, which is characteristic of the immersion solvent method. This fact allows for it to be used, in some cases, without any further cleaning, though, for best results, an alkaline cleaner should be included in the cleaning cycle.

The finishing of Aluminum, like the metal itself, is still in its infancy. Destined to grow and improve and ear-marked for bigger and better things. At the time of this writing, one of the better known laboratories expects momentarily to come out with a process for producing an Aluminum Oxide film similar to the anodic films, by immersion. It is obvious what a tremendous help this will be to Aluminum finishers, particularly those who are finishing Aluminum rivets and bolts in bulk. This and many other innovations will surely take place in the days to come, so, it behooves every fore-sighted plater to get in on the ground floor and be ready to play his part when he is called upon to play it.

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"Discussion on Various Types of Salt Baths and Heat Treatment of all Kinds of Metals" — DR. HAIG SOLAKIAN.

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The Fundamentals of Chemistry for Electroplaters

Part VII. Chemical Equations and Their Uses

By SAMUEL GLASSTONE, D.Sc., Ph.D.

CHEMICAL REACTIONS

IN a chemical reaction (or chemical change) one or more substances undergo a transformation of such a kind as to lead to the production of one or more new substances with properties which differ from those taking part in the reaction. For example, the addition of potassium cyanide to a solution of silver nitrate results in the formation of a visible white precipitate of silver cyanide. In this case a chemical reaction has taken place between the reacting substances, namely, silver nitrate and potassium cyanide, as a consequence of which an entirely new substance, silver cyanide, is formed. The properties of the silver cyanide are quite different from those of silver nitrate and potassium cyanide; the latter two, for instance, are each able to dissolve in water to form clear solutions, but silver cyanide cannot dissolve to any appreciable extent. It is because it is insoluble in water that silver cyanides separates as a white precipitate when the reacting substances are mixed in solution. It may be noted that in the reaction under consideration the silver cyanide is not the only product; it is the obvious product, since it is visible to the eye, but there is another substance, namely, potassium nitrate, formed at the same time. This happens to be soluble in water, and so it remains in solution, where it cannot be seen; nevertheless its presence could be proved by certain chemical tests.

The simple illustration of a chemical reaction just given raises two points, among others. First, is it possible to tell whether all the products of a given reaction have been detected, and second, is there any way of finding out how much of the products should be obtained? The second of these questions has another aspect, that is, how much of the reacting substances are required to yield a certain amount of product? As seen above, in the reaction between silver nitrate and potassium cyanide the obvious result is the formation of silver cyanide; is there some means by which we could know whether another product is formed at the same time? Further, can we tell how much silver cyanide is obtained from a certain amount of silver nitrate?

Silver cyanide is used in the preparation of the familiar cyanide bath for silver plating, and it is obtained by means of the reaction under consideration. It might be of interest to know, therefore, how much silver nitrate and potassium cyanide must be mixed in order to produce a certain amount of silver cyanide. The answer to these and related questions for chemical reactions in general is given by means of chemical equations, based on the known formulas of the substances taking part in the reaction. The principles used for determining the formulas of chemical compounds were described in the preceding article (Part VI, Monthly Review, April 1944); the application of these formulas for the expression of a chemical reaction in the form of an equation will now be considered.

CHEMICAL EQUATIONS

A chemical equation is a sort of balance sheet which summarizes the essentials of a chemical reaction as regards the nature and amounts of the reacting substances and products. The use of chemical equations is based on the indestructibility of matter and the law of conservation of mass, referred to in Part II (Monthly Review, Dec., 1943). Consequently, any atom which appears on one side of the equation must appear equally, although perhaps in a different combination, on the other side of the equation. As stated above, the chemical equation is a balance sheet; the total entries on both sides, although they may appear in different forms, must balance exactly, and nothing must be missing.

The general practice is to write the formulas of the reacting substances on the left hand side of the equation and the products on the right hand side. To return, for example, to the reaction between silver nitrate and potassium cyanide; the respective formulas of these substances are $AgNO_3$, where Ag is the symbol for silver and NO_3 for the nitrate radical, and KCN, where K stands for potassium and CN for cyanide. These substances are dissolved in water, but in this case the water plays no direct part in the reaction; it merely acts as a vehicle or medium within which the reaction occurs, and so the reacting substances on the left hand side of the equation are $AgNO_3$ and KCN. The product, silver cyanide, has the formula AgCN, and so it is possible to write the tentative equation

$$AgNO_3 + KCN = AgCN + ?$$

From an examination of this expression it is evident that the two sides are not properly balanced; in order that every atom may appear equally on both sides of the equation it is necessary to add KNO_3, which is the formula for potassium nitrate, to the right hand side. The result is

$$AgNO_3 + KCN = AgCN + KNO_3,$$

and this is the complete equation. It tells us that, in the first place, the reaction between silver nitrate and potassium cyanide results in the formation of silver cyanide and potassium nitrate as the only products. In view of the exact balance of the two sides of the equation, there can be no other products. This is, however, not the only information provided by the equation. It tells us, also, that one molecule of silver nitrate interacts with one molecule of potassium cyanide with the consequent formation of one molecule of each of the products.

WEIGHTS IN CHEMICAL REACTION

Since the relative weights of the molecules are equal to their molecular weights, which are equal to the respective sums of the atomic weights (see Parts II and III), these give the weights in terms of which the substances react. The molecular weight of silver nitrate, $AgNO_3$, is made up of 107.9 (for the silver atom, Ag) plus 14.0 (for the nitrogen atom, N) plus $3 \times 16.0 = 48$ (for the three oxygen atoms, O_3), giving a total of 169.9. Similarly, the molecular weight of potassium cyanide, KCN, is 39.0 (for the potassium atom, K) plus 12.0 (for the carbon atom, C) plus 14.0 (for the nitrogen atom, N), making a total of 65.0. It follows, therefore, that 169.9 parts by weight of silver nitrate reacts with 65.0 parts by weight of potassium cyanide, with the consequent formation of 133.9 parts by weight, which is the molecular weight, of silver cyanide, together with 101 parts of potassium nitrate. Suppose it is required to make 10 pounds of silver cyanide; it can be calculated by simple proportion that it is necessary to mix 12.7 pounds of silver nitrate and 4.85 pounds of potassium cyanide, assuming these substances to be almost pure. It may be noted that sodium cyanide, NaCN, molecular weight 49.0, could have been used in place of the equivalent amount of potassium cyanide.

Although silver cyanide is insoluble in water, it is able to dissolve in a solution containing excess of potassium (or sodium) cyanide, because of the formation of a complex salt known as an argento-cyanide; this substance is the basis of the cyanide silver-plating bath. The chemical equation representing its formation may be written as

$$AgCN + KCN = KAg(CN)_2,$$

so that it requires one molecule of potassium cyanide to dissolve one of silver cyanide. In other words, in order to dissolve one molecular weight i.e., 133.9 parts by weight, of silver cyanide, it is necessary to add a minimum of one molecular weight, i.e. 65.0 parts, of potassium cyanide. Information of this kind is of course of great value in the preparation of cyanide plating baths.

OTHER CHEMICAL REACTIONS

In the reactions considered above one molecule of each of the reacting substances takes part in the process, but this is not always the case; one, two, three or more molecules may be involved. In the preparation of zinc cyanide, $Zn(CN)_2$, for example, sodium or potassium cyanide is added to a solution of a zinc salt, such as zinc sulfate, $ZnSO_4$. The reaction may be represented by means of the equation

$$ZnSO_4 + 2KCN = Zn(CN)_2 + Na_2SO_4.$$

A comparison of the two sides of the equation shows that there is an exact balance, atom for atom, between the reacting substances and the products. Knowing the atomic weights of the various elements present in the reacting compounds, it is a simple matter to calculate the weights of zinc sulfate and of potassium (or sodium) cyanide which must be mixed in order to obtain a certain weight of zinc cyanide. It may be mentioned, incidentally, that commercial zinc sulfate crystals have the formula $ZnSO_4.7H_2O$, since there are seven molecules of "water of crystallization;" allowance for this must be made when calculating the weight required for a given reaction.

The foregoing discussion of the applications of chemical equations has referred particularly to the formation of cyanides, since these substances are of particular interest in electroplating. However, similar information can be obtained from entirely different types of equations representing quite different reactions. Many of these are important in various aspects of chemistry, especially in connection with analytical chemistry, and some of them will be referred to in later articles.

★ ★ ★

ANNOUNCEMENT

OAKITE PRODUCTS, INC. cordially invites all ladies who register at the Cleveland A. E. S. Convention to be their guests at the AUNT ELLA SOCIETY LUNCHEON which will be held on Tuesday, June 13th, at 1:00 P. M. The name of the hotel where the luncheon is to be held will be announced by Mrs. Grace A. Lyons, Chairman of the Ladies Committee, at a later date.

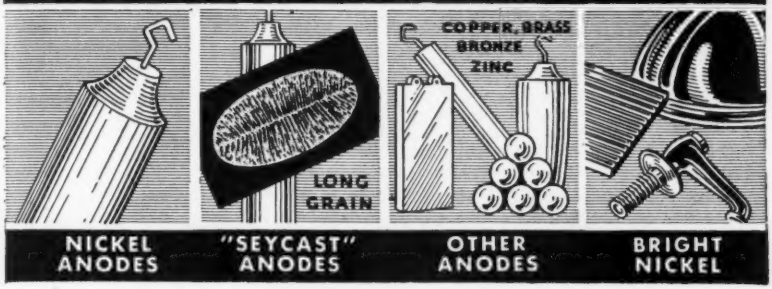
D. X. Clarin
Aunt Ella's Personal Secretary.

CONTROL YOUR PLATING SOLUTIONS

KOCOUR TEST SETS

KOCOUR CO. • 4725 S. CHRISTIANA AVE. • CHICAGO

SEYMOUR ANODES



NICKEL ANODES

99%+ Rolled Depolarized—A very fine, homogeneous, even-grained virtually pure nickel anode. Corrodes in hot or cold solutions with minimum metallic loss. Forms practically no sludge. Especially suitable for baths having a pH above 4.5 electrometric.

99%+ Cast Oxide Depolarized—Almost entirely pure nickel. Suitable for most cold nickel baths, but especially those having a high pH. Corrodes evenly under most ordinary shop conditions.

99%+ Cast Carbon—A pure nickel anode with carbon content adjusted for smooth, uniform corrosion without special controls. Available, however, with carbon content to meet any specifications. Adaptable for general run of shop work requiring cold baths.

95-97% Sand Cast—Corrodes readily in solutions low in nickel or weak in salts—therefore suitable for cold, high pH, low current density plating solutions. Uniform corrosion throughout the life of this anode is obtained by an even distribution of the carbon content. A 90-92% Sand Cast Seymour Nickel Anode is also available.

"Seycast" — An improved type of 99%+ cast anode of very high efficiency designed primarily for Bright Nickel baths, but works perfectly in any hot Watts bath having a pH of 4.5 electrometric or lower. Corrodes evenly with practically no loose nickel formation, due to long, interlocking grains radiating from a common center. Especially suitable for high current densities.

Bright Nickel — A hot organic type process free from promoter metal, stable and easily controlled. Produces brilliant deposits from a standard hot nickel bath without the usual coloring or buffing. Excellent throwing power. Wide operating conditions. Free from wetting out agents.

OTHER ANODES

Seymour Anodes in all shapes to meet rigid specifications are also made in copper, brass, bronze and zinc. The copper used is electrolytic. The zinc is always the best grade obtainable.

THE SEYMOUR MANUFACTURING CO.
61 FRANKLIN ST., SEYMOUR, CONN.

Non-Ferrous Alloys Since 1878

The Why of

SPARKLER
HORIZONTAL PLATE
FILTERS

1. **FASTER, MORE UNIFORM FILTERING.** The streamlined Sparkler plates reduce friction and increase flow rates. The high quality of the filtering never varies.

2. **LONGER FILTERING CYCLES.** Filter aid cake is built up horizontally and thicker. Will not crack or break off, insuring longer cycles and less frequent cleaning.

3. **PORTABLE AND COMPACT.** Units are mounted on casters and can be quickly moved to any place where needed. Take small floor space.

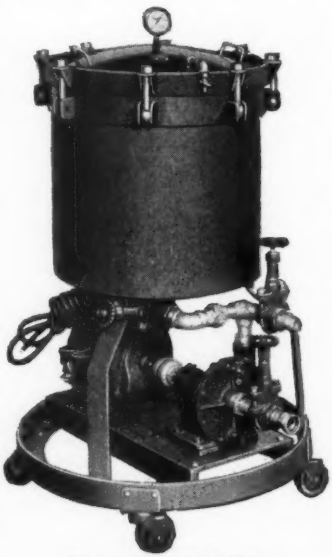
4. **EASY TO CLEAN.** Plates are interchangeable.

5. **USE ANY FILTER AID.** Diatomaceous earths, activated carbons, filter cloths or filter papers. Less filter aid is required, and less time and material for precoating.

6. **OVER 30 MODELS** for large or small plating operations.

~

Let a Sparkler engineer assist you on your filtration problems—no obligation. Write for this free service.



50 to 10,000 G.P.H.

Sparkler Filters purify any fluid of suspended matter, in any quantity, using any filter aid that produces the best results.

SPARKLER MANUFACTURING CO.
273 LAKE STREET **MUNDELEIN, ILLINOIS**

DARCO cleans out those plating solution GHOSTS

DARCO S-51 gets rid of "ghosts" that haunt electroplating solutions—those *imperceptible impurities* that slow down production and waste time, labor, metals, precious solvent and metal. It doesn't stop with a partial job—it does a *complete* purification job and it does it right.

By far the best known and most widely used activated carbon in the industry, DARCO S-51 purifies by *adsorption.* Its expansive surface seizes decomposition products, grease, oil, soap, colloidal impurities and all unseen pollution—keeps them from contacting the metal. Result: A solution you can depend on for top quality plating.

Suited to many kinds of electroplating—bright nickel, cyanide zinc, cadmium, copper, iron, gold, silver—DARCO S-51 handles the purification job at low cost: A dime's worth keeps 100 gallons of solution clean for almost a week.

Pass the job to DARCO! See your dealer or write for a sample. And if you have a special purification problem to lick, let us help you.

Darco—Reg. U. S. Pat. Off.

DARCO

This trademark identifies the genuine. Accept no packages without it.

DARCO
CORPORATION
60 East 42nd Street
New York 17, N. Y.

A NEW LACQUER

for Masking Parts *for* Hard Chrome Plating

Over the past few years, two Miccrome Supreme Stop-Off Lacquers have been widely used for masking parts for hard chromium plating. Both have proved highly acceptable for this purpose. However, Miccro chemists, after months of intensive research and development work, have produced a new material which not only offers the desirable characteristics of the other lacquers but provides a number of additional advantages as well.

Thoroughly tested in actual plating production, this new lacquer—known as Miccrome—is now immediately available for use in your hard chrome plating work. Let us send you full information.

Providing ALL of These Advantages

- **EASY TO APPLY**
  Brushing, dipping or spraying results in smooth, even coats.
- **VERY FAST AIR DRYING**
  Force drying is not necessary.
- **EXCELLENT ADHESION**
  Adheres perfectly — even to chrome plated surfaces — during plating.
- **EASY TO REMOVE**
  Can be quickly peeled or dissolved after plating. In hard-to-reach spots can be blown off with compressed air after hot soak. Clean-up time reduced to minimum.
- **EXCELLENT DIELECTRIC STRENGTH**
  Deposit is accurately controlled and minimum current is lost.
- **CAN BE TRIMMED SHARPLY**
  Always a clean line of demarcation.
- **GOOD VISIBILITY**
  Clear red color provides good contrast to exposed surfaces.

MICCROME

~ Developed and Manufactured by Experienced Platers ~

MICHIGAN CHROME & CHEMICAL CO.
6344 EAST JEFFERSON • DETROIT 7, MICHIGAN

"AN LST HAD TO BE READY WITHIN 96 HOURS"

PENNSALT CLEANER #23

helped finish the job in 48

Here's the story as our own technician tells it:

PROBLEM: The subject company makes LST (landing ships for tanks). Deck plates are made at a distant plant and, to prevent rusting, are painted with a zinc chromate base in a bakelite or glyceral phthalate vehicle. The shop men had great difficulty in stripping this paint from the plates and the chief chemist called on us because he believed we might have had some experience. It was 11 a.m. Friday when we were called in. *He told us that one of the ships, which still needed deck plates installed, had to be complete for a trial run within 96 hours.*

EQUIPMENT USED: As speed was essential, a special wooden tank was built and lined with sheet metal.

METHOD USED: A solution of Pennsalt Cleaner #23 was made up and heated to 212° F. The deck plates were immersed for 15 minutes, rinsed and dried.

RESULTS: At 11 a.m. Sunday (exactly 48 hours after we were called in) enough plates had been stripped for four LST's and all necessary plates were installed in the ship required for test run.

REMARKS: Customer was greatly pleased. Pennsalt Cleaner #23 was the only satisfactory stripper they had tried. They were pleased too because the job saved 48 hours.

Let our technical staff consult with *you*. Perhaps one of this famous family of Pennsalt Cleaners can help save time, material or labor on your specific metal cleaning problem. Write fully to our Special Chemicals Division, Dept. MR.

PENNSYLVANIA SALT MANUFACTURING COMPANY

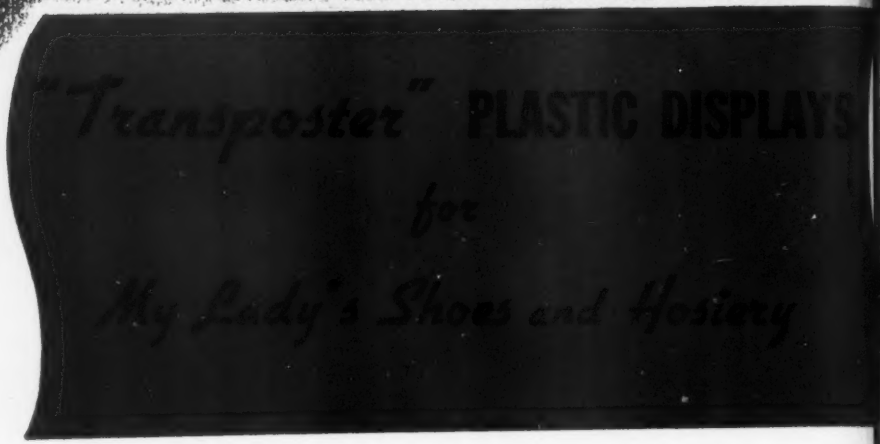
Chemicals

1000 WIDENER BUILDING, PHILADELPHIA 7, PA.

NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • MINNEAPOLIS
WYANDOTTE • TACOMA

SPECIAL CHEMICALS DIVISION PRODUCTS

Acid-Proof Cements • Alkali-Proof Cements • Lead Fluoborate Concentrates • Fluoboric Acid • Acid, Alkali and Solvent-Emulsion Type Cleaners • Paint Strippers.



Attractively Finished

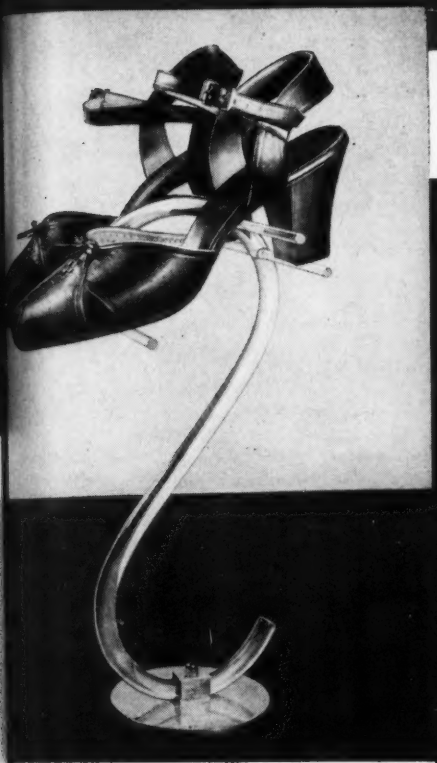
WITH THE HELP OF

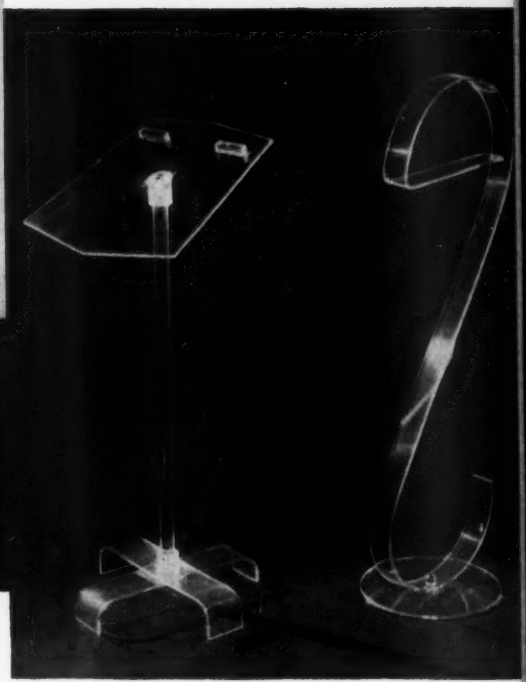
LEA METHODS *and* MATERIALS

This isn't war work, as so much in plastics and metals is today. But it does involve the production of articles needed to help maintain, so far as possible, our normal business contacts, one of which is to display available merchandise attractively. These Shoe Stands, made of LUCITE or PLEXIGLAS by Transposter Service of Boston, contribute their share.

But note how dainty and delicate they are. It takes real skill, the proper methods and proper materials to finish these stands without damaging them. LEA Finishing Specialists helped to devise proper finishing methods and are providing the materials as needed.

This finishing service to Transposter is typical of what





LEA can do and is doing for the plastic industry as a whole. Perhaps you have a finishing problem that is bothering you. Why not call in a LEA specialist?

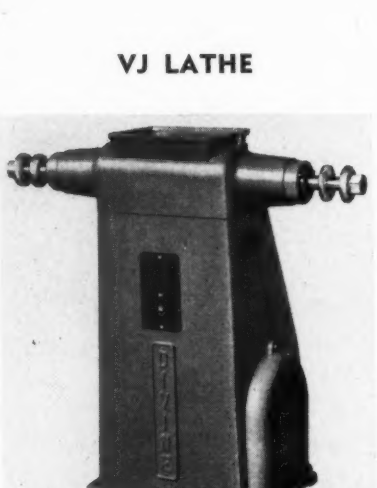
THE LEA MANUFACTURING CO.

Waterbury 86, Conn.

Burring, Buffing and Polishing . . . Manufacturers and Specialists in the Development of Production Methods and Compositions

NEW Equipment Materials Supplies

VJ LATHE



The demand for a light duty lathe for sma.l parts polishing and burring is filled by the VJ Lathe manufactured by Divine Brothers Company, Utica, New York. The VJ Lathe is a V Belt-driven unit, with motor sizes up to 3 HP, and spindle speed range to a top of 3850 RPM. The lathe may be used with taper spindle extensions for bob-work.

Two sealed-for-life spindle bearings of ample capacity eliminate entirely the need for periodic lubrication of spindle bearings. The spindle is V Belt-driven for a NEMA standard motor. An adjustable motor base provides V Belt adjustment.

The starter is mechanical push-button type with thermal overload relays for motor protection.

The roomy composition tray and spring return, spindle lock pin are standard equipment.

The straight front, cast base assures rigidity of bearing mounting. Louvers in rear doors provide motor ventilation.

Spindle length overall 44" for wheels up to 2" wide, 1¼" is standard spindle diameter, with 4" flanges machined all over, and bronze spindle nuts.

Optional extras are longer spindle, two speed drive, and magnetic starter controlled by stop-start lever brake.

STANDARD PICKLING CONTROL

The American Chemical Paint Co. recently published an illustrated technical service data folder on Rodine, a standard control for the pickling bath. The Rodine process revolutionized pickling of steel and has been responsible for saving vast quantities of metal since its introduction.

For a copy, write to American Chemical Paint Co., Ambler, Pa.

NEW BLAKESLEE - CATALOGUE

G. S. Blakeslee & Company, Chicago 50, Ill., announce a new catalogue ready for distribution. Featured is the BLAKESLEE Solvent Degreasing Machine Process and the Blakeslee solvent BLAKCOSOLV.

WYANDOTTE OFFERS PAMPHLETS ON CALCIUM CHLORIDE

During the past year Wyandotte Chemicals Corp. has issued a completely new set of pamphlets on Calcium Chloride which is complete information on every use of this material.

Some 13 different folders on various uses of Calcium Chloride have been produced and are offered to those interested.

UNICHROME ALKALINE COPPER PLATING

Informative 6-page booklet describes the Unichrome Alkaline Copper Plating Process which has recently been installed for a wide variety of war-essential operations. The speed and operating efficiency which this process offers as well as the extreme smoothness and ductility of the deposit it produces will prove equally advantageous for countless peacetime applications.

Copper deposits can be produced quickly and easily by this process within reasonable tolerances of required dimensions. Some installations are being operated at speeds which give .001" of copper plate in less than 20 minutes, yielding greatly increased production per unit of equipment.

The exceptional smoothness of the deposit provides an excellent base for bright nickel plating without polishing or buffing. In cases where the base metal does not have the required degree of polish and buffing is required, the use of this easy-flowing copper effects substantial savings in labor costs, buffing wheels and compounds.

An outstanding advantage of the process is the non-toxic, non-gassing and non-corrosive solution employed. The bath contains no cyanide, does not attack clothing or equipment and gives off no objectionable or injurious fumes during operation.

Plating facilities of the type found in most shops are easily converted for use with this process. No ventilation is necessary. A standard preliminary cleaning cycle is employed. After plating, no special cleaning or activation is required prior to the deposit of other metals. No brighteners, wetting agents or other special addition agents are used.

Important among its advantages is the low operating temperatures utilized —100°F. to 140°F.—and resultant low heating costs. Throwing power is excellent; anode and cathode efficiencies are 100%. Replenishment cost is low because the solution is free rinsing and does not deteriorate during the plating operation or build up with carbonate. Since the solution is nearly neutral and operating temperatures are low, it is less severe on rack coatings and stop-off materials than highly alkaline solutions operated at high temperatures.

The leaflet also contains a plating speed table, showing the time required to obtain various thicknesses as well as the wide range of current densities at which the process can be operated. Copy sent on request to United Chromium, Inc., 51 East 42nd Street, New York 17, N. Y.

A CHEMICALLY CLEAN SURFACE

What is Clean? Why Necessary?

A clean metal surface is a surface freed of all invisible, as well as visible, contaminators. Only clean metal surfaces will retain a satisfactory final finish whether it be by plating, enameling, or painting.

The metal industry, after many years in research endeavoring to prevent premature failure of final metal finishes, found the chief cause of failure to be improper preparatory cleaning.

Proper Cleaning Essential

Proper cleaning is more than the removal of visible rust, scale and oxides, or even the microscopic particles remaining in the surface pits—the rust producers and other invisible contaminants must be removed or so changed that they will not develop under the applied finish.

Many materials will give a clean and uniform-looking surface to metal, which has been freed of visible impurities, yet will leave it highly unsafe to paint. Addition to the rinse water of *alkaline* materials will generally do just this.

Among the alkaline materials that are added to rinse baths are caustic soda, soda ash, sodium chromate, mixtures of sodium chromate and sodium bicarbonate. If the metal has been cleansed by an alkali process and then rinsed in an untreated water bath, there is bound to be an alkali accumulation retained which will be harmful to organic coating life.

The Deoxidines are the original phosphoric acid type cleaners. They contain, in general, phosphoric acid, grease solvents, wetting agents, emulsifying agents. The correct type of Deoxidine affords a method for removal of visible impurities which leaves the least amount of invisible harmful residues.

—American Chemical Paint Co.

NEW BUFFING COMPOSITION CATALOGUE

Frederic B. Stevens, Inc. of Detroit have just issued a new catalogue, which

in addition to describing the various compositions they manufacture, contains numerous articles and charts pertaining to modern materials and methods used in polishing, buffing, deburring and cleaning operations.

The book is one of the most comprehensive of its kind ever published by any manufacturer, and will undoubtedly prove of value to metal finishers.

BACTERIA GROWTH IN COOLANTS

Of vital concern today to safety engineers and supervisors, shop superintendents, and other plant executives is the control or prevention of bacteria growth in coolants used in various machining, cutting, grinding and other operations. To help combat contamination of these oil-water emulsions which, in some cases, is the source of dermatitis infection on the hands and bodies of machine operators, a new 4-page Special Service Report just issued by Oakite Products, New York, describes many important, successfully used preventive measures.

The Report stresses the need for thoroughly cleaning out main supply tanks, individual tanks on machines, lines, pumps, etc., to remove any bacteria-harboring films or accumulations. It outlines methods and material for subsequent germicidal treatment which has proven unusually effective for this work.

Also given are eleven sanitation suggestions for plant cleanliness and individual hygiene, in connection with the handling of these oil-water coolant solutions, that will help prevent bacterial contamination and rancidity and extend solution life.

Free copies of this interesting Report are available on request! Write to Oakite Products, Inc., 40 Thames Street, New York 6, N. Y.

THERMO-ELECTRIC GLUE HEATER

Divine Brothers offer a pamphlet describing their THERMO-ELECTRIC GLUE HEATER. The unit has a multiple pot system which offers these advantages:

1. By heating glue in rotation it is possible to have fresh glue.

2. Fresh glue is "sweet" hence wheel heads last longer and polish more pieces per head.

3. Separate pot for each grain size.

4. Pot covers keep glue clean and free from wasteful scum.

5. Makes for batch to batch uniformity so important to wheel head success.

TURCO VULCO-ETCH

A new method for rendering aluminum surfaces chemically and metallurgically clean in preparation for spot welding, is announced by TURCO PRODUCTS, INC. of Los Angeles and Chicago. TURCO VULCO-ETCH is a chemical bath which frees aluminum alloy surfaces of oxides, corrosive salts, and tenacious grease and oil films.

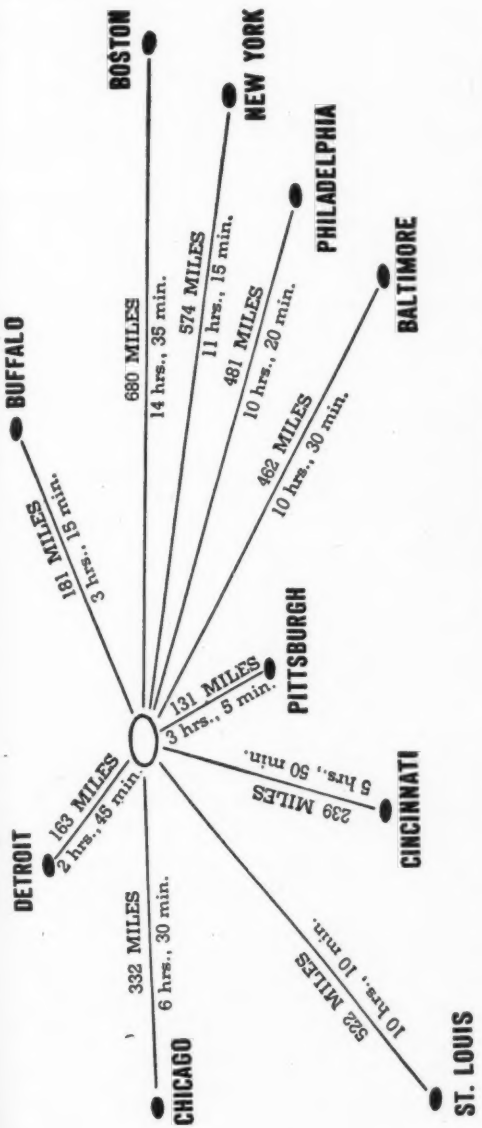
Consistent, strong spot welds cannot be obtained if the aluminum surface is oxidized, oily or contaminated with corrosive salts. When the surface in contact with the electrode is not perfectly clean, resistance of the metal to the flow of electrical current is increased. The resultant excessively high temperatures may be responsible for cracked welds, blow holes and other irregularities. Further, surface impurities in the electrode area tend to become fused into the weld. These impurities cause unsymmetrical weld contours, and weaken the weld by reducing tensile strength, the elasticity, and the fatigue resistance of the metal.

VULCO-ETCH lays the foundation for sound spot welding by assuring a chemically and metallurgically clean surface. Cleaning and etching are accomplished in a 5 to 20 minute dip in the VULCO-ETCH solution. Unheated wood-lined, rubber-lined or crockery tanks are used. The material rinses freely in fresh, cool running water. The VULCO-ETCH solution is long-lived, and may be used for months without change.

RAIL FARES TO CLEVELAND

Below we have tabulated the rail fares for a round trip from your city to Cleveland. With the modern coaches and special service trains such as the Empire State and The Mercury giving you de luxe travel at no extra cost, we are listing only coach tariffs.

To the rates as listed below please add the Federal tax of 15% on all rail travel.



Anderson	9.85
Baltimore-Washington	15.15
Binghamton	14.65
Boston	22.50
Bridgeport	19.25
Buffalo	7.85
Chicago	12.85
Cincinnati	10.10
Dayton	8.40
Detroit	6.90
Grand Rapids	11.90
Hartford	19.25
Indianapolis	11.35
Lancaster	15.00
Los Angeles	121.20
Milwaukee	16.25
Montreal	21.50
Newark	18.55
New Haven	19.25
New York	18.85
Philadelphia	16.95
Pittsburgh	5.65
Providence	24.48
Rochester	10.05
San Francisco	121.20
Springfield	19.25
St. Louis	17.60
Syracuse	12.50
Toledo	4.55
Toronto	13.40
Waterbury	19.25

INDUSTRY NEWS

COWLES — CHICAGO MAN

The Cowles Detergent Company, Cleveland, Ohio, manufacturers of metal cleaners and industrial alkalies, announce the appointment of Norman E. Garman as Cowles Technical Engineer for the Chicago territory. Norm Garman is an experienced Process Metallurgist and well equipped with education and experience to render expert service on all kinds of metal cleaning problems.

PENN SALT ADDS PERSONNEL

Pennsylvania Salt Manufacturing Company announces the following additions to its Research and Development Department Staff:

Dr. R. D. Evans, formerly with New Jersey Zinc Company; Mr. E. A. Bruce of Blaw-Knox Company; Mr. F. W. Jakob, recently discharged from the U. S. Army as 1st lieutenant and graduate of Pennsylvania Military College; Mr. J. L. Staubly of National Association of Dyers and Cleaners; Mr. J. M. Swales of U. S. Navy Inspection Department; Mr. J. J. McBride of Franklin Research Company; Miss Katherine Dilworth of Delaware County Hospital; and Miss Gertrude Schutze of National Broadcasting Corporation.

New staff members also include Miss Margaretta E. Aeugle of Duke University and Miss Gladys Molyneux of Cornell University.

Mr. Thomas Toovey, well known pulp and paper specialist, has been transferred from Sales Service to the Research and Development Department where he will have supervision of research and development work related to new and improved pulp and paper chemicals.

CONVENTION NEWS

The Ladies' Committee has planned to "Kill the Fatted Calf" when the ladies assemble for a good time in Cleveland, while their menfolk are smoothing out their plating problems and gaining "Victory Through Science". Aunt Ella will be here and Joan Trumbour, with her array of lovely prizes from the Fellowship Society, will conduct the favorite Bingo Party. That "Special Gift" in true Cleveland style has been arranged for. We hope many ladies will come and enjoy the three full days with us.

CONWAY JOINS UDYLITE CORPORATION

Bernard J. Conway, for twelve years connected with the Proctor Electric Company of Philadelphia has recently become a member of the engineering and service staff of the Udylite Corporation's New York office.

Mr. Conway's experience as manager of the buffing and polishing division and later as head of all metal finishing

operations at the Proctor Company, especially qualifies him for his new work.

He will be in charge of the territory comprised of all southeastern Pennsylvania and southern New Jersey. His headquarters will be Philadelphia where he has many friends in the metal finishing industry.

REEVE PASSES

Amos G. Reeve, termed as "one of the builders" of Oneida Ltd. and organizer of the first Buffalo Branch A. E. S., died March 31, 1944 at Sherrell, New York, after an illness of several weeks.

At the age of 15, Mr. Reeve joined Oneida Ltd. in the plating room and at 21 was placed in charge of that department. Five years later Mr. Reeve was assistant superintendent of the silverware plant at Niagara Falls. From that time until he retired on a pension in 1931, his knowledge of the silverware business was one of the great assets of that business.

PLATING FOREMAN

We are looking for a man who will be able to take charge of the plating, painting and finishing department in one of our Pennsylvania plants manufacturing electronic equipment.

Sound technical knowledge of electroplating, chemistry, and allied fields very helpful, but good practical experience in copper, nickel, gold, zinc, chromium, and rhodium plating more important.

Must be able to get along well with people and be able to plan and organize his work efficiently.

Reply giving age, education, experience, and salary desired to start. Early and convenient interviews will be arranged for qualified applicants. *Monthly Review*, Box 5.

WILLIAMS NOW V-P PRODUCTION WESTVACO CHLORINE PRODUCTS

W. N. Williams, formerly Assistant to the President, Westvaco Chlorine Products Corporation, has been elected Vice-President in Charge of Production.

Mr. Williams, a Westvaco director since 1941, joined the company in 1924 in a production supervisory capacity and subsequently became General Manager of Westvaco's West Coast operations. Transferred to New York in 1938 in an executive sales capacity, he became Assistant to the President in 1941.

SAX GETS SURPRISE

The American Buff Company, 711 W. Lake Street, Chicago, Illinois recently received a photograph from the Public Relations Department of the United States Marine Corps. The purpose of this photograph was for use in any house organ or trade journal depicting a marine telephone operator under combat conditions somewhere in the far Pacific Islands.

Imagine the surprise of Mr. Ben P. Sax, head of the American Buff Company when, upon opening the envelope he discovered that it was none other than his son, Harold. Mr. Sax had not heard from his son in quite some time and this was a most unusual way of contact between son and father.

Mr. and Mrs. Sax have two other sons in the service; one attached to the Navy and another in the Army. In addition to this, Mr. Sax is proud to have 33 other relatives, such as nephews and cousins, represented in all branches of the services.

STANTON JOINS MAGNUS

The Magnus Chemical Company, Inc., Garwood, New Jersey, manufacturers of industrial cleaning materials, announces the appointment of Avery H. Stanton as Technical Engineering Consultant.

Mr. Stanton, a graduate of the Massachusetts Institute of Technology, was formerly with the War Production Board at Washington, D. C.

He is well known to the Pulp and Paper Industry, having been actively associated with this industry for a number of years prior to serving in Washington.

The major portion of Mr. Stanton's activities in his new position will be devoted to Government Agencies and the Pulp and Paper Industry in regard to Industrial Cleaning and Process Control Compounds.

NEWARK BRANCH LADIES AUXILIARY

The Ladies' Auxiliary of the Newark Branch report the following officers for the new fiscal year and their activities.

New Officers

President, Mrs. Robert Sizelove
Social Secretary, Mrs. John Kotches
Secretary-Treasurer, Mrs. E. B. Washburn

Meetings held every third Friday of the month.

Every third Wednesday the ladies entertain the soldiers at the Weequahic Hospital in Newark, N. J. Home-made cakes, soft drinks, and games are supplied by the ladies. Mrs. E. Bauer plays piano for the boys.

MRS. E. B. WASHBURN, *Sec.-Treas.*

BUY WAR BONDS

MOST EFFECTIVE . . . because of the superior close, firm grain and individual abrasive qualities.

MOST DURABLE . . . because of the special tanning process that makes the fibres particularly tough and flexible.

MOST SATISFACTORY . . . because compounds such as pumice, emery and crocus do not load, gum up, or fill the fibres.

THE RESULT . . . G-T Walrus Leather produces on any metal a more brilliant, richer mirror finish than can be secured by any other polishing method.

AVAILABLE NOW . . . in any thickness from ½ inch to 1¼ inch, for any size wheel or bob.

GREENE, TWEED & CO.
Bronx Blvd. at 238th Street,
New York 66, N. Y.
Plants: New York, N. Y. & North Wales, Pa.

G-T WALRUS LEATHER
for fine finishing
GREENE, TWEED

MONTREAL BRANCH

SUPPORTS PROPOSED AMENDMENTS BY LETTER TO ALL BRANCHES

Dear Sir:

Enclosed you will find an official copy of the Amendments to the Constitution as proposed by Montreal Branch and which are to be presented for action to the 1944 Convention.

These amendments have been drafted as a result of the remarks presented at the 1943 Convention by past President Feeley and at the request of the delegates assembled at that time.

For some years now at each Convention the opinion has been expressed that some changes should be made in our Constitution so that our Society might be brought more up to date with a view to meeting the everchanging conditions for which it was originated, namely, the advancement in knowledge of the work in which we are all interested.

The Committee formed from the different classes of membership of Montreal Branch feels that the adoption of these amendments would contribute in a large measure towards advancing our Society, and therefore, I would kindly ask you, as Secretary of your Branch, to have them brought before your members for their serious consideration.

As it is quite possible that many of our members personally may not like to have the name changed, may we ask them through you to consider this amendment only from the best interest of the Society as a whole.

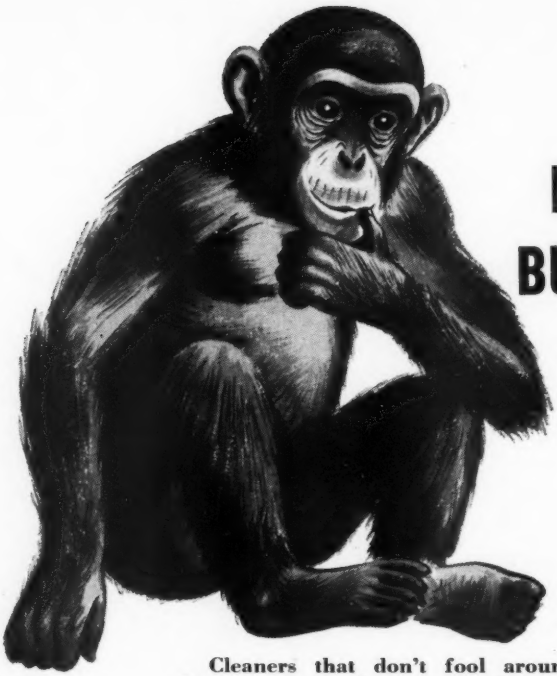
There are also two amendments, namely, #11 and #12, which at the present time are of great importance. The adoption of these, we feel sure, would be of great assistance in promoting a better spirit of cooperation among our present members, as well as offering to many prospective members an opportunity to become associated with a Society where their efforts for our advancement may be rewarded.

The assistance of the officers and members of your Branch is kindly solicited in this important matter.

Yours truly,

JOHN H. FEELEY,

Chairman of Committee for
Amendments to the Constitution.



NO MONKEY BUSINESS HERE

Cleaners that don't fool around—that don't hold up the works in metal cleaning and degreasing operations—*that's* the reputation Wyandotte proudly maintains in the metal trades.

Specialization for the individual task, a smooth-working, speedy efficiency in *getting the job done*—these have made Wyandotte Products welcome for thousands of metal cleaning tasks. Tasks met under the hurry-hurry of war's ceaseless demands . . . in airplane manufacture, munitions, and scores of other industries vital to the war effort.

Wyandotte Products not only save time and labor, and measure up to any job, big or little. They save, too, on *rejects*. In the most delicate and precise of cleaning operations, they are *safe* on the surfaces to be cleaned.

Always ready to talk over your cleaning problems—to help you get cleaning jobs done more quickly and ably—is the Wyandotte Representative. Call him in—he's always on tap.

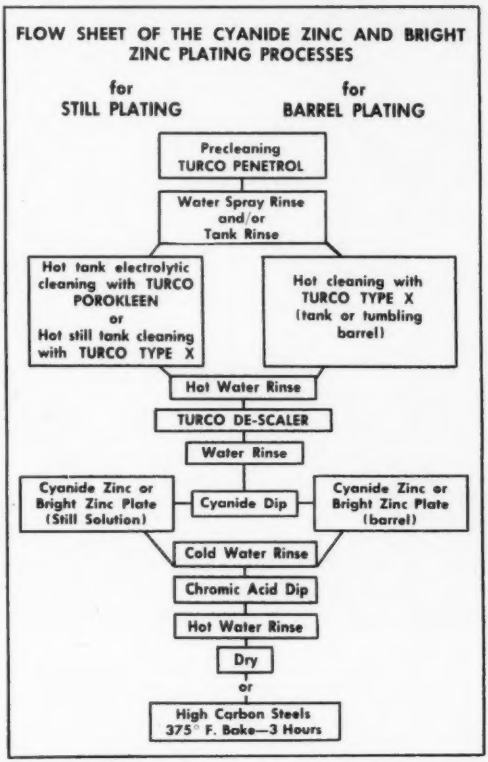
Wyandotte
REG. U. S. PAT. OFF.

Wyandotte Chemicals Corporation · J. B. Ford Division · Wyandotte, Michigan

Service Representatives in 88 Cities

ZINC PLATING

TYPE X
POROKLEEN
PENETROL


FLOW SHEET OF THE CYANIDE ZINC AND BRIGHT ZINC PLATING PROCESSES
for STILL PLATING
for BARREL PLATING
Precleaning TURCO PENETROL
Water Spray Rinse and/or Tank Rinse
Hot tank electrolytic cleaning with TURCO POROKLEEN or Hot still tank cleaning with TURCO TYPE X
Hot cleaning with TURCO TYPE X (tank or tumbling barrel)
Hot Water Rinse
TURCO DE-SCALER
Water Rinse
Cyanide Zinc or Bright Zinc Plate (Still Solution)
Cyanide Dip
Cyanide Zinc or Bright Zinc Plate (barrel)
Cold Water Rinse
Chromic Acid Dip
Hot Water Rinse
Dry
or
High Carbon Steels 375° F. Bake—3 Hours

Working in co-operation with industry, Turco research chemists and field engineers have solved the plating problems of hundreds of war production plants. The data thus compiled has been summarized in a comprehensive bulletin.

"CYANIDE ZINC AND BRIGHT ZINC PLATING"

Turco offers this bulletin as a free service to industry. It describes materials, equipment and the practicable technique required in most plating operations where it is necessary to replace cadmium plating with zinc plating.

A consultation with your nearest Turco Field Service Man, who will prescribe the material and equipment you need, merely awaits your request.

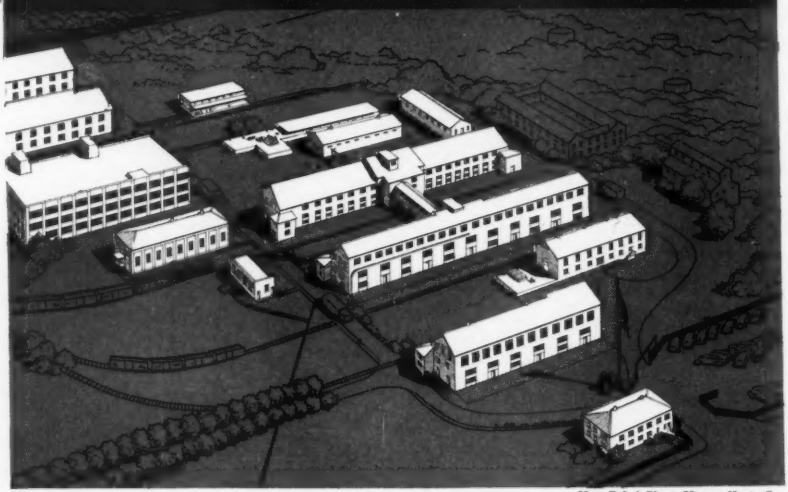
BUY MORE WAR BONDS

Turco PRODUCTS INC.

SPECIALIZED INDUSTRIAL CHEMICAL COMPOUNDS

MAIN OFFICE & FACTORY: 6135 SO. CENTRAL AVE., LOS ANGELES 1
SOUTHERN FACTORY: 1606 HENDERSON ST., HOUSTON 10, TEXAS
CHICAGO OFFICE & FACTORY: 125 WEST 46TH ST., CHICAGO 9, ILL.
SERVICE MEN AND WAREHOUSE STOCKS IN ALL PRINCIPAL CITIES

AGAIN *GENERAL CHEMICAL* CREATES NEW FACILITIES FOR BAKER & ADAMSON PRODUCTS TO SERVE AMERICAN INDUSTRY!



New B & A Plant, Marcus Hook, Pa.

These new facilities for production of B&A reagent and fine chemicals provide ideal manufacturing areas, additional research and development laboratories, and special storage and shipping accommodations. This plant's output, coupled with that of other Baker & Adamson producing units and distributing stations throughout the United States, marks another forward step in Baker & Adamson leadership.

Basic materials for many Baker & Adamson quality products made here come directly from sixteen of General Chemical Company's producing locations. With such fundamental sources of supply, including many Company-owned mines for raw materials, Baker & Adamson is in a pre-eminent and unique position for meeting the expanding uses of high-purity chemicals in industry.

Whether you require laboratory reagents, fine chemicals, or other products prepared in accordance with your formulae—avail yourself of the Baker & Adamson facilities. Experienced technical service representatives are ready to discuss *your* chemical problems and requirements. Baker & Adamson stocks are carried in many principal cities!

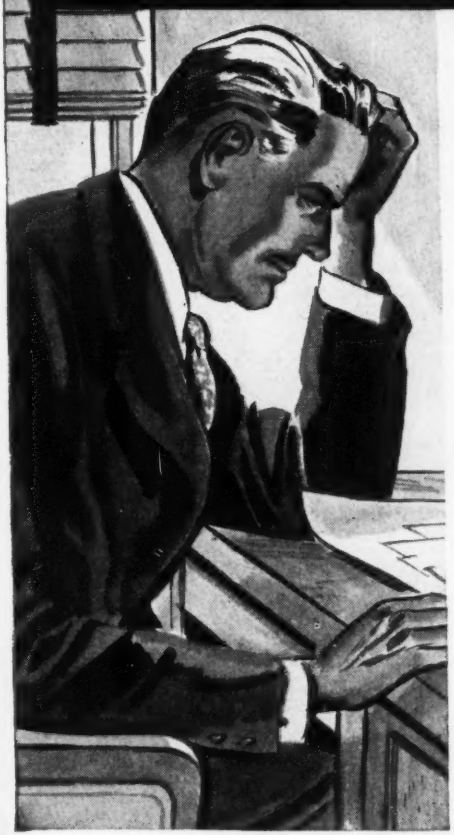
Fine Chemicals for Industrial America

BAKER & ADAMSON

B&A STANDARD OF PURITY

Here's Egyptian Doing It Again....

Enamel, Olive Drab, Rust-Inhibiting
U. S. Army Specification *No. 3-181*



Egyptian offers this important "spec" finish with the usual Egyptian "plus" in quality, applicability and appearance.

It is a one-coat paint system over phosphate-treated or solvent-cleaned steel such as Metal Ammunition Containers, Landing Mats, Metal Tool Kits, Metal First Aid Kits, Metal Bins, Tables, Water and Blitz Cans exterior — also Gasoline and Water Drums and other drums and pails.

Comes in three types: I — for dip application; II — for brush and spray application; III — for roller coat application. Can be baked in convection-type oven or infra-red bank.

THE EGYPTIAN
LACQUER MANUFACTURING
COMPANY
ROCKEFELLER CENTER, NEW YORK 20, N.Y.

Egyptian's new U. S. Government "Spec" Book—4th Edition—is ready. It's helpful and it's FREE. Send for your copy. Please address Dept. S-5

EGYPTIAN FINISHES

EGYPTIAN
SUPERIOR FINISHES

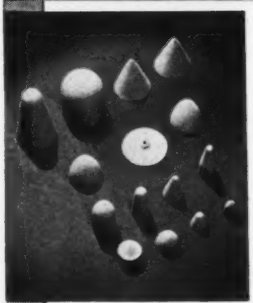
AMERICAN MADE *Felt* POLISHING WHEELS

First BECAUSE THEY'RE *Finest*

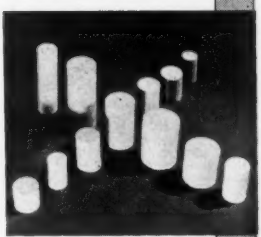
"American Made" Felt Polishing Wheels are made of high grade pure wool. No loading or weighting of any character is used. The material is uniform in texture throughout the wheel. Hardness is acquired by shrinkage of wool only — the greater the shrinkage the harder the wheel. Made in any diameter, also in face widths from ½" to 6". For wider face widths, submit specifications. "American" felt wheels are made in nine degrees of hardness.

Write, wire or phone for further information.

Felt BOBS FOR *Better* JOBS



"American Made" Felt Bobs properly set up, are used extensively for all types of burring and polishing operations. Easily formed and retaining their shape, they are ideal for irregular surfaces. The perfect medium for internal polishing and for those hard to get at surfaces.



AMERICAN BUFF COMPANY

Factory & General Offices

711 WEST LAKE STREET, CHICAGO 6, ILLINOIS

Sales Offices in Principal Cities

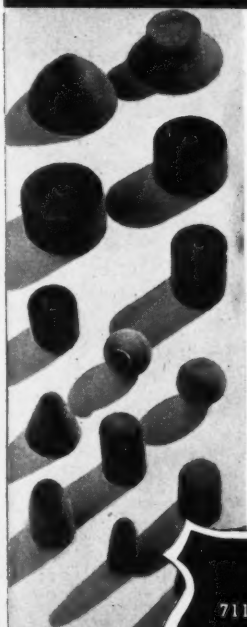
Write, wire or telephone for further information concerning Polishing and Burring BOBS of other Materials, such as Cloth, Sheepskin, Walrus and Bullneck Leather Bobs.

AMERICAN MADE

WORK WONDERS

with *Walrus Leather*

POLISHING WHEELS & BOBS



Walrus leather provides ideal qualities for polishing, finishing and burring. The face of a walrus leather polishing wheel has a velvet-like finish, is tough and long-wearing. It is firmly and compactly grained, yet its fibres are flexible and long-wearing. This quality of face is splendid for holding pumice, emery, crocus, rouge and other polishing compounds without loading, gumming or filling. It also has its own distinctive abrasive qualities.

We can cut any size wheel required in different degrees of thickness, from ½ inch to 1½ inches.

"AMERICAN MADE" WALRUS LEATHER BOBS are precision-made into every required shape and size. Particularly useful in finishing aircraft parts. "American Made" Bobs retain their shapes under all conditions where it is necessary to get at irregular and hard-to-get-at surfaces. They are perfectly machined on the same size screw point spindle on which the bob is intended to be used.

Large stock of GREENE, TWEED WALRUS HIDES always on hand.

We generally carry in stock, full hides ¾" to 1¼" thick. You can also procure from us full hides or sections cut into strips, blocks or various sizes.

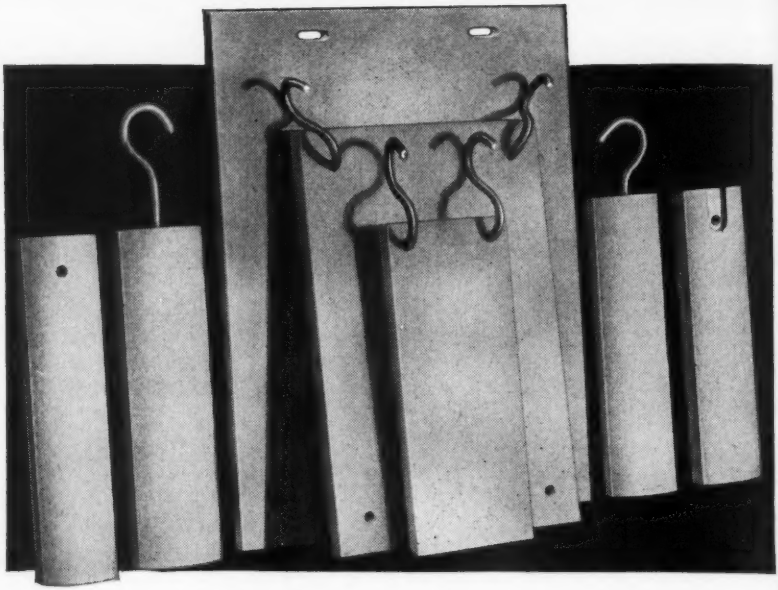
Write, wire or telephone us for further details concerning walrus leather polishing wheels and bobs and other "American Made" wheels, buffs and bobs made of all types of cloth materials, sheepskin, and bullneck leather.

AMERICAN BUFF COMPANY

Factory & General Offices

711 WEST LAKE STREET, CHICAGO 6, ILLINOIS

Sales Offices in Principal Cities



Enjoy all these advantages with *Anaconda Copper Anodes*

Anaconda Copper Anodes—whether Sheet, Oval, or Electro-deposited—contain less than 0.01 percent of total metallic impurities. This unexcelled high degree of purity pays you with the following advantages:

1 Copper goes into solution faster and more uniformly.
2 The highest quality deposit is produced in the shortest possible time.
3 Slime is reduced to an absolute minimum.
4 Spotting and discoloration of the deposit are eliminated.
5 Scrap losses are exceptionally low.

American Brass produces a complete line of Copper, Brass, and Bronze Anodes . . . rolled Sheet or Oval . . . cut to your own specifications or standard sizes . . . drilled or undrilled . . . with or without hooks—also Electro-deposited Anodes.

Our entire output of Copper is now devoted to the war effort, and Anaconda Anodes are available on a high preference rating. For present or future reference, write for Publication C-5. 43159A

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THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Conn. • *Subsidiary of Anaconda Copper Mining Company.* In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

There's Strength Below the Water Line

WHEN the going is smooth it doesn't matter, but let a storm come and the skipper is grateful for every bit of reserve strength and stamina that has been built into his craft.

Likewise, the extra utility, serviceability and long-life value that Stortsweldmanship imparts to plating tanks and their accessory equipment are a source of lasting satisfaction to our customers. Most of this sound, rugged construction is below the water line, where it doesn't show. In times of stress it is certain protection against tank failures.

STORTS WELDING COMPANY

42 Stone Street Meriden, Conn.

Manufacturers of Welded Fabrications to Specification

BRANCH NEWS

Business and Social News • Educational Activities

BUFFALO BRANCH

The Buffalo Branch held its regular April meeting Friday evening, Apr. 14th at 8:00 P.M. in the Chinese Room of the Hotel Statler, Vice-President Wernlund taking the chair in the absence of President Logan. All the other officers were present. The minutes of the March meeting were read and approved.

The proposed amendments from the Newark and Toronto Branches were read and placed on file. After a short discussion it was decided to make exceptions to our custom of not instructing our delegates. On a motion by Don Rice, duly seconded and passed with no dissenting votes, the following instructions were prepared for our delegates:

1. Vote against any change in the name of our Society.
2. Vote for the proposed reduction in the per-capita tax.

A letter from the Los Angeles Branch soliciting our support of Mr. Rynkofs for the office of 3rd Vice-President, was read and placed on file. Mr. Fotheringham moved that, in this matter, we should follow our established custom of not instructing our delegates. This was seconded by Mr. Gipp and carried

The treasurer's report was read, indicating the purchase of a $500 interest-bearing War Bond and a substantial balance. This was heartily approved and placed on file.

Following our business session, Librarian Fotheringham took the chair long enough to introduce our speaker, Dr. Wernlund who presented a paper on "Twenty Years of Progress in Zinc Plating". This paper was presented a few months ago at a meeting of the Toronto Branch and it is hoped that it will appear in the Review in the near future.

After a rising vote of thanks to Dr. Wernlund, the meeting was adjourned at 10:45.

JAMES C. MAYS, *Secretary*

PHILADELPHIA BRANCH

Philadelphia Branch A.E.S. had a dinner meeting on their 4th Friday of March at the Broadwood Hotel with about 50 members attending.

A most enjoyable time, with liquid refreshments, was had by all.

Al Hirsch's Platers' Class from the Mastbaum Vocational School were present, and papers were presented and read.

The judges awarded the Al Hirsch bronze metal for the best paper to Leonard Burden, who graduated this year.

The excellent year books of the Newark Branch were distributed at this meeting.

There was no business meeting, and the gathering broke up at a late hour.

PAUL MENTZER, SR., *Secretary*

The officers of the Philadelphia Branch A.E.S. held a business session at the home of President Verrell, 1858 E. Clementine St., Philadelphia, Pa., April 5, 1944.

The minutes of the previous meeting were approved as read.

The applications of William H. McCall, Jr., active, and Robert A. Chilcott, associate, were referred to the Board of Managers.

The communications from W. L. Pinner were ordered received and filed.

W. H. Bann, active; C. C. Kimber, associate; and A. H. Akamoto, active; were suspended for non-payment of dues.

Nomination of Officers:

President—E. J. Zurbach, Jr.
1st Vice-President—H. G. Orlik
2nd Vice-President—L. T. Burden
Treasurer—George Long
Secretary—Paul Mentzer, Sr.

Librarian—Al Hirsch plus a committee of two.

Board of Managers:

George Gehling, Joe Underwood, Nat Verrell

Delegates:

H. G. Orlik, Nat Verrell, Paul Mentzer, Sr., E. J. Zurbach, Jr.

Alternates:

George Long, Joe Underwood, Al Hirsch.

PAUL MENTZER, SR., *Secretary*

MILWAUKEE BRANCH

The Milwaukee Branch held its regular monthly meeting on April 6th in the Republican Hotel. Election of officers was the main business of the evening. Mr. Robert Steuernagel, Jr. was reelected President, Mr. Henry Binder was elected First Vice-President, Mr. Frank Marx was elected Second Vice-President, Mr. James Durnford was reelected Secretary-Treasurer, Mr. William Geissman was reelected Librarian, Mr. Ray Goodsell was elected to a two-year term on the Board of Managers, and Mr. Axel H. C. Johnson was elected to a three-year term on the Board of Managers. Mr. Geissman wanted to be relieved of his position as Librarian, but the Milwaukee Branch has had such a successful year with exceptional speakers and large turnouts that he was unanimously reelected.

After the election Mr. Geissman introduced Mr. C. Smith, Research Chemist of the Detrex Corporation, who spoke on "Electro Polishing". He explained the uses of solutions for different metals. Although somewhat curtailed by the absence of polished work at the present time, research is still being carried on. Better adherence of the plate and finer polishing are a few of the advantages of electro polishing of metals. Mr. Smith's talk proved very informative and interesting and he was given a hearty round of applause. The meeting adjourned.

JAMES DURNFORD, *Secretary*

ROCHESTER BRANCH

The Rochester Branch held its regular monthly meeting at 8:00 P. M. at the Hotel Seneca on Friday, April 14th.

President John Adams opened the meeting after a brief talk about fishing. The secretary read the minutes of the previous session and also read the treasury report for February and March, including the proceeds of our Banquet and Educational Session held March 11th, which proved a huge success.

The delegates for our National Convention will be instructed at the next meeting on how to vote on the various changes in by-laws that are going to be submitted this year at Cleveland.

The secretary will, before the next meeting, provide every member with a copy of the changes to be voted on at the National Convention.

Mr. Henry Strow of McDermid, Inc. gave us a very interesting paper entitled "The Evaluation of Metal Cleaners". His talk on evaluation touched on the various subjects, such as P. H., emulsifying power, surface tension, buffering action, and life expectancy of metal cleaners.

Mr. Strow then explained the method for testing cleaners by electrical conductivity, using a "Solu Bridge", which he had brought along for this purpose. Questions were asked and answered.

Mr. Strow was given a rising vote of thanks.

Meeting adjourned at 10:30 P. M.

DONALD C. BLUM,
Secretary-Treasurer.

LOS ANGELES BRANCH

The Los Angeles Branch held its regular monthly meeting Monday, March 13th at the Rosslyn Hotel.

Our annual Education Session and Dinner Dance being only five days away, we decided that instead of having a speaker we would have an old time bull session talk about anything and everything.

Coxswain Paul Wood of U. S. Coast Guard related some of his experiences in the South Pacific and also emphasized the wonderful work the Red Cross is doing there.

Minutes and financial reports were read and approved.

Bills ordered paid.

E. W. Wells, 3rd vice president read a letter from Mr. Pinner regarding exhibits for National Convention. After

some discussion it was moved and carried that Mr. Pinner be asked to excuse the Los Angeles Branch this year.

Mr. Manuel Sanz and Harold Cochard's applications were read and voted on, then turned over to board of managers.

Marcus Rynkof, chairman of the Dinner Dance committee gave a final report on same. If all reservations show up it will be the biggest affair we have ever had. It was moved and carried that the Branch donate a $25.00 war bond for one of the door prizes.

Meeting adjourned 10:30 P.M.

C. C. McLaren, *Sec'y & Treas.*

QUESTION BOX

1. How do you strip brass from copper? *No answer.*

2. I have a dichromate dip for zinc parts after plating. Looks all right after dipping but when dry forms white spots on metal. Would like to know how to get away from this? Metal is chromeallie steel zinc plated. *Answer.* Agitate dichromate dip. Also check rinse.

3. Is it possible to deposit iron or steel on brass or over iron that has to be built up one-sixteenth or one-eighth of an inch thick and what might be the formula and what kind of annodes must be used? *Answer.* Try cold rolled steel.

4. Which makes the best gold solution, gold cyanide or gold chloride? *Answer.* Cyanide solution for thin deposit or color. Chloride for heavy deposit.

MONTREAL BRANCH

The meeting of Jan. 13th, 1944, of the Montreal Branch A. E. S. was called to order at 8:30 P.M. by Mr. J. T. Reisenburg, our Chairman.

The secretary was requested to read the minutes of the previous meeting. These were moved adopted as read by Mr. J. H. Feeley and seconded by Mr. C. Silverman.

Mr. Reisenburg notified the members present that the Montreal Branch has been fortunate in securing through the kind co-operation of the "Nichols Chemicals Co." and "The General Chemicals Company," N. Y., the services of Mr. W. B. Sherry, as speaker for our February meeting. It was decided to have an invitation letter typed and sent to such companies in Montreal whose employees may be interested in the subject of "Some Newer Fluorine Compounds" and their application in the "Field of Electroplating."

A very interesting question on the subject of corrosion as occurring between steel screws set in aluminum, was submitted by Mr. Goodman of R. C. A. Victor. Mr. Wm. Gauvin of McGill University, a member of Montreal Branch, gave a very interesting and educational explanation of the question.

Meeting adjourned at 10:45 P.M.

Wm. G. Finlay, *Sec'y*

MONTREAL BRANCH

The Montreal Branch A. E. S. held an open lecture at the Mount Royal Hotel in the "Convention Hall" 9th floor at 9:00 P.M., Feb. 7, 1944.

Mr. J. H. Feeley introduced the speaker for the evening, Mr. W. B. Sherry, of the "Nichols Chemical Company." Mr. Sherry's subject was "Some Newer Fluorine Compounds" and their use in electroplating solutions. Mr. Sherry introduced his subject by outlining the Development of the use of Fluorine Compounds and their importance in modern industry.

The attention of the audience and the quality of the questions and answers was sufficient evidence that the 75 persons present were amply repaid for their attendance.

The meeting adjourned at 10:45 P.M.

Wm. G. Finlay, *Sec'y*

NEWARK BRANCH

The regular meeting of Newark Branch was held at the Robert Treat Hotel, Newark, New Jersey, on March 17th, 1944. The meeting was called to order by President William Bruhns at 8:30 P.M. All other officers were present.

The minutes of the previous meeting were read and approved. The following applications were voted to take the regular course: Walter Zahniser, Associate; Metaldo Ditze, Active.

Mr. Smith, Mr. Washburn and the Secretary reported that they with a delegation from Newark Branch visited New York Branch on their February meeting and heard a very interesting discussion by Dr. Murray on Indium plating.

The Committee appointed to investigate the possibilities of reducing the Per Capita Tax reported that this matter had been discussed thoroughly at a Committee meeting and it was proposed

that Newark Branch go on record to propose an amendment to the By-Laws of our Constitution lowering the Per Capita Tax from 45% to 35% per member. The Secretary was authorized to have this amendment published in the April and May issues of the *Monthly Review* and also to send a copy of said amendment to each individual Branch.

Ed Washburn, our Librarian, then gave a very interesting discussion and demonstration on spot checking for foreign metals in certain solutions. Ed promised to have all the tests prepared and written up to be published in the *Monthly Review.*

The meeting adjourned at 10:30 P.M.

GEORGE WAGNER, *Sec'y*

SYRACUSE BRANCH

February Meeting

A regular meeting of the Syracuse Branch was held on Feb. 25 at Bowne Hall, Syracuse University.

The meeting was called to order at 8:30 P.M. by Dr. N. F. Murphy, our president. The minutes of the previous meeting read and a financial accounting was made.

The meeting was featured by a discussion period on "Silver Plating" led by Mr. F. C. Mesle. Mr. Mesle presented a paper on "Difficulties in Silver Plating" covering some of the problems he had encountered from time to time in plating silver, along with the answers. He also discussed the adherence of silver deposits, and the effect of the application of heat on adherence of silver and showed some interesting slides illustrating the change of structure of the deposit when subjected to various temperatures.

Mr. Mesle's talk was followed by a discussion of various aspects of silver plating with high speed silver plating the most frequently broached subject.

Following the discussion, our president, Dr. N. F. Murphy gave a demonstration of the analysis of a typical silver plating bath. Dr. Murphy explained the procedures and handed out mimeographed sheets containing complete instructions for determining silver, cyanide, and carbonate in a silver plating bath. Our members found this to be a very instructive demonstration.

March Meeting

A regular meeting of the Syracuse Branch was held on March 24 at Bowne Hall, Syracuse University.

The meeting was called at 8:15 P.M. by our president, Dr. N. F. Murphy.

The minutes of the previous meeting were omitted in order that the business of the evening be started promptly.

Our speaker for the evening was Dr. F. C. Jelen of the Cowles Detergent Co. Dr. Jelen gave a comprehensive and informative talk on "Electropolishing" along with an actual demonstration of the process on a piece of stainless steel. Typical formulae for electropolishing baths were given, along with data on operating conditions, life of the bath, stock removal per unit of time, etc. Dr. Jelen also presented figures on the economy of operation of an electropolishing bath and discussed both present and future applications for electropolishing, especially its application in future, completely automatic bright plating set-ups.

Dr. N. F. Murphy announced the appointment of Lindley S. Wood and Robert J. Hilgenberg to serve on the membership committee with Paul Swartz as chairman.

NEIL C. MAFFEI, *Sec'y-Treas.*

DETROIT BRANCH

The regular monthly meeting of Detroit Branch was held on Friday, March 3rd, 1944, with President J. E. Fritts presiding. There was an attendance of 87 members and friends.

After the reading of the minutes of the February meeting, the following were elected to membership: Charles H. Houghton, Active; Lloyd A. Clark, Associate; Ross C. Allen, Active; Richard J. Wooley, Associate; Sigmund A. Stachowski, Associate; Albert Barland, Active.

Applications for membership were acknowledged from: Howard W. Knight, Active; John Toth, Active; George W. Harding, Active; Stanley E. L. Townsend, Associate.

A very colorful and entertaining picture was shown entitled "Trees and Homes" depicting the story of lumber from the forest to the home.

Mr. B. J. Lewis, Northwest Chemical Company, who is a member of our Branch and has presented a number of fine papers, was the speaker, his subject being, "Mechanization in the Plating Room." The talk was well emphasized with graphs and charts.

The question box was taken care of by our librarian.

F. L. CLIFTON, *Sec'y-Treas.*

HARTFORD BRANCH

The March meeting of the Hartford Branch of the A. E. S. was held at the Stanley Golf Club, New Britain, Conn. Because of a very heavy snowstorm only eleven people attended a very fine steak dinner arranged for by our Librarian, Harry Sanders. The meeting was called together by President Bellinger at 8:15.

It was announced that Mr. Hogaboom, the speaker of the evening, had changed his membership from the Newark Branch to the Hartford Branch. A motion was made and seconded to make George an honorary member of our chapter because of his longstanding membership in the society and the great amount of effort which he has put forth toward the betterment of the organization. This was refused by Mr. Hogaboom who feels that he would like to remain an active member so that he can take an active part in the society.

Attention was called to the Regional Meeting which will be held in New Haven on April 22 and everyone was urged to buy tickets early. Attention was called to Hartford's position in the membership drive and it is expected that we will have the membership trophy for this year unless some other branch puts on an unusually heavy drive at the last moment.

Mr. Hogaboom, the speaker of the evening, was then introduced. His talk was about new developments in the electroplating industry. He is always an interesting speaker because he is so widely traveled and known and he brought many new ideas to the meeting with him. He pointed out that he does not feel that the electroplating society has played an active enough part in the present war effort as a society and he indicated where he felt our efforts would lie in the future. He discussed various metallic finishes such as nickel, cadmium, zinc, tin, aluminum, and magnesium.

His presentation was unusual in that he invited the various members to interrupt him in his talk if there was some particular phase which they would like to have elaborated on more fully. Because of this genuine interest and the number of questions, the meeting did not break up until about 10:30.

Mr. Hogaboom was given a rising vote of thanks and the various members of the society expressed the desire to hear him again in the near future.

K. P. BELLINGER, *Sec'y*

CHICAGO BRANCH

The regular monthly meeting of Chicago branch was held Friday, April 14, 1944 at the Atlantic Hotel.

President R. J. Hazucha presiding and all other officers present. A letter from Milwaukee branch regarding their annual educational session and banquet April 29th, read and placed on file.

A letter from Los Angeles branch regarding support for Mr. M. D. Rynkofs, as a Third Vice President read and referred to the delegates.

An amendment proposed by Newark branch read and referred to the delegates. A letter and several amendments proposed by the Montreal branch read and discussed and referred to the delegates.

President Hazucha appointed Mr. O. Kocour and Mr. C. E. Proudfoot as tellers and judges of our annual election of officers.

The following officers were elected for the 1944-1945 fiscal year: President R. J. Hazucha, 1st Vice President P. H. Krause, 2nd Vice President V. Mattacotti, Secretary-Treasurer J. W. Hanlon, Librarian C. W. Carter, Board of Managers, C. Kelly, G. S. Krentel, H. Thomsen.

The delegates to the Cleveland convention were as follows: J. W. Hanlon, F. K. Savage, M. H. Longfield. Alternates, F. J. Hanlon, C. M. Iwen, W. J. Erskine.

Our Librarian, Mr. Krentel, introduced the guest speaker of the evening Captain R. P. Shimmin, Jr., Packaging Section, Chicago Ordnance District, who made a very interesting talk on current problems of packaging war goods for export shipment.

Mr. Krentel urges all Chicago branch members to send in their exhibits to the Cleveland convention, as most anything of general interest can be exhibited.

The following questions were found in the question box:

#1. What etching acid can be used on worn files before hard chrome plating. *Answer.* It was suggested a 15 to 20 second dip in nitric acid.

#2. What finish can be used other than black iron oxide to produce a blue or black such as used on gun barrels. *Answer.* Suggested that the molten salt peter dip be tried.

#3. What is the lowest concentration of chromic acid that can be used in a chrome bath and obtain good bright de-

posits. *Answer.* One member stated that he had done this at 15 oz. per gal. of chrome acid but the proper practice is 33 oz. chromic acid with 100-1 acid ratio.

There were 58 in attendance at this meeting which adjourned at 10:20 P.M.

J. W. HANLON, *Sec'y*

CLEVELAND BRANCH

Minutes of the meeting of the Cleveland Branch of the American Electroplaters' Society held in the Cleveland Hotel on Saturday evening, January 28, 1944:

The meeting was called to order at 8:30 P.M. by our President, Mr. William E. O'Berg.

The minutes of the previous meeting and also the treasurer's report were read and approved.

The applications of Mr. William Charles Lang of Cleveland, Ohio, as Active and Mr. Russell O. Kline of Cleveland, Ohio, as Active were read and referred to the Board of Managers.

Chairman Miller, of the Entertainment Committee, reported that nearly all arrangements had been completed for the Dinner Dance to be held February 19, 1944.

Mr. Scott spoke of the work the 1944 Conference Committee was doing and also their need for more funds, he suggested that the Branch make an additional loan of $300.00. Such a motion was made by Mr. C. Shoemaker and seconded by Mr. T. Hammer. Motion was carried.

We were then favored by a few remarks from Mr. C. Shoemaker who seemed to feel that the meetings were not as well attended as they should be. He said that greater effort should be made to bring out more of the members by making the programs more attractive. To this we all agreed. On the strength of this feeling Mr. C. A. Fullerton made a motion that Mr. Shoemaker be appointed chairman of a "Bring Them Out" committee—he to select such other personnel as he deemed necessary. Motion was seconded by Mr. Lyons and carried.

Mr. Honnecker gave us a rather encouraging report on the activities of the Educational Committee for the 1944 Conference.

The speaker of the evening, Dr. D. T. Ewing of the Michigan State College was then introduced. His subject was Practical Applications of Physical Chemical Principles to Electro Deposition Processes.

We assumed the audience expected the usual dry, academic summation of "Theory vs. Practice" and were pleasantly surprised to hear a man who has a first-hand knowledge of the problems which confront the production plater. His talk covered "Alloy Plating" in detail and Faraday's Law in relation to it. Dr. Ewing has conducted careful research on alloy coatings and exposure tests indicate a promising future in this field. He pointed out that inasmuch as alloys of metals are "tailor-made" to fit specific conditions, alloy coatings would be deposited to meet the exacting exposure and corrosion requirements of tomorrow.

His humorous comment on "Theory" was well received inasmuch as it was addressed to an audience who has held the same idea for many years. Dr. Ewing's opinion of the importance of the "interface" should project immediate and future research into this phase. His explanation of the terms, "hard" and "brittle" were quite simple and to the point. Dr. Ewing is most certainly not a "Test-tube" plater, and he proved this by his ready and brilliant answers to the many questions put at the conclusion of his talk. The members enjoyed every minute of his conversation and hope to have the pleasure of hearing him again.

After a rising vote of thanks to Dr. Ewing for his excellent talk, the meeting adjourned at 11:00 P.M.

GEORGE B. SVENSON, *Sec'y*

Minutes of the meeting of the Cleveland Branch of the American Electroplaters' Society held in the Cleveland Hotel on Friday evening, February 25, 1944:

The meeting was called to order at 8:30 P.M. by our President, Mr. William E. O'Berg.

Mr. Miller gave a report on the Dinner Dance which showed a profit of $8.19. Mr. Scott gave his report on the 1944 Convention.

Mr. Honnecker, our Librarian, then introduced the guest speaker of the evening, Dr. D. A. Swalheim of the DuPont Company who spoke on "Continuous Electroplating of Strip Steel." The speaker showed charts and slides on the various operations used in the process. After a few questions, Dr. Swalheim was given a vote of thanks.

The meeting adjourned at 10:30 P.M.

WILLIAM D. SCOTT, *Acting Sec'y*

Minutes of the meeting of the Cleveland Branch of the American Electroplaters' Society held in the Cleveland Hotel on Saturday evening, April 1, 1944:

The meeting was called to order at 8:30 P.M. by our President, Mr. William E. O'Berg.

The minutes of the previous meeting and also the meeting of January 28 were read and approved.

The applications of: Mr. Arthur H. Du Rose of Euclid, Ohio, as Associate; Mr. Gene A. La Sarge of Cleveland, Ohio, as Active; Mr. Otto Vajgl of Cleveland, Ohio, as Active were read and referred to the Board of Managers.

The following candidates whose names were read at the January 8, 1944, meeting and which were published in the February issue of *The Monthly Review* were elected to membership: Mr. Melvin C. Balke of Painesville, Ohio, as Associate; Mr. Earl C. Chrisman of Painesville, Ohio, as Active; Mr. Stephen Palisin of Lakewood, Ohio, as Active.

There was then read Mr. Walter L. Pinner's letters of March 6th and 7th sent to all Branch Secretaries. This was in reference to exhibits for the coming Conference.

Mr. Scott reported considerable progress being made on the preparations for the June Conference. In line with this, Mr. Thompson showed a sample of the cover page of the Conference Program which immediately met with the approval of all present.

The Treasurer's report was read and approved.

The subject of the evening was then brought up, namely, the annual election of officers, etc. The following were elected:

George B. Svenson, President
Stephen F. Miller, First Vice President
Fred M. Carlson, Second Vice President
Ralph A. Schaefer, Librarian
Harvey P. Heil, Secretary & Treasurer
William E. O'Berg, Board of Managers
Eric S. Thompson, Board of Managers
P. Ross Lyons, Board of Managers
Eric S. Thompson, Delegate
Carl Shoemaker, Delegate
C. Arthur Fullerton, Delegate
Charles F. Ott, Alternate
William D. Scott, Alternate
Ernest V. Collins, Alternate

A motion was then made and carried that the Delegates to the Annual Conference be given $25.00 each for expenses, etc.

Mr. Lyons advised that the favors for the Ladies at the Conference had been obtained in March so as to save the extra Federal Tax effective April first and that the bill would have to be paid shortly. He thought that inasmuch as the Branch had already advanced considerable funds to the Conference Committee that it might be preferable if a few of the members underwrote this particular item. This was agreed to at once by several present.

President O'Berg then announced that the new officers would be installed at the next meeting which would be held on May 6th.

There being no further business, refreshments were ordered and the meeting adjourned at 10:30 P.M.

GEORGE B. SVENSON, *Sec'y*

BOSTON BRANCH

Boston Branch met Thursday, April 6th at the Statler Hotel, Boston with President Swift in the chair.

Minutes of the previous meeting were dispensed with because of a late start. Communications were read and placed on file. Bills were read and ordered paid.

The chairman of the banquet committee made its report of the banquet stating that it was one of the most successful banquets ever held by the branch, and the chairman Bob Smith thanks all the members, their friends, and all the supply houses for their support, the committee was given a rising vote of thanks for a great job.

Five applications were read for the first time and turned over to the board of managers for approval: Paul J. Topelain, 74 Merrick Street, Worcester, Mass., active; Napoleon A. Vigeant, Towle Mfg. Co., Newburyport, Mass., active; Harold F. Stevens, Towle Mfg. Co., Newburyport, Mass., associate; Edmund W. Kindred, 13 Lake Ave., Woburn, Mass., associate and George Fairbairn, 14 Rutland Street, Cambridge, Mass., active.

A nominating committee will be named by the chair at the next meeting to draw up a slate of officers for the coming year, the members will have the right to nominate any one from the floor for office. Delegates to the convention at Cleveland in June will also

be named at this meeting.

With all business out of the way the librarian, Bob Magnuson, had as the speaker of the evening, Mr. A. F. Persons, of Providence Base Works, General Electric Co. His subject "Applications of Hard Chrome Plating."

Mr. Persons, an engineer, is principally concerned with the design and uses of tools in drawing, forming, and stamping sheet metal parts. He has carried on experimental work on chrome plating and was prepared to discuss some of the faults as well as the advantages of such plating.

Mr. Persons covered about everything from the stamping of the metal to the hard chrome plating of those parts. He had a great many parts stampings and tools that have been plated and used and replated. These were passed around for the members to see.

He answered all the questions and even after the meeting had adjourned he was still answering questions. He was given a rising vote of thanks for one of the best talks in a long time.

Meeting adjourned at 11 P.M.

A. W. GARRETT, *Sec'y-Treas.*

BRIDGEPORT BRANCH

The regular monthly meeting of the Bridgeport Branch of the American Electroplaters' Society was held Friday, March 4, 1944 at the Hotel Barnum. President A. R. McNeil opened the meeting at 8:30 P.M. with 22 members present.

The roll call of officers was read and Librarian J. E. Charleson and Board of Managers, B. F. Kusterer, Wm. Thompson and R. J. O'Connor were reported absent. The minutes of the previous meeting were read and accepted.

The Exhibit Committee in charge of F. J. Kalafus with the assistance of F. B. Gotthardt, Stavin Pochna and Lawrence Griffin, report good progress being made on a variety of displays to be made up by the Bridgeport Branch. These will be presented at the National Convention in June 1944 at Cleveland, Ohio.

The Projector Committee has no report to offer at this time.

The Regional Meeting Committee with President A. R. McNeil giving us a report that progress is being made with more information and details to be reported at the April meeting.

F. B. Gotthardt, chairman of the Sick Committee reported no illness during the past month.

Hubert M. Goldman, chairman of the Membership Committee reported one application for membership and one balloting for member.

A. R. McNeil, member of the Technical Sessions Committee, reported arrangements were made for an open meeting to be held March 17th at 8:00 P.M. at the Barnum Hotel. The speaker of the evening will be Mr. Ed Bucy of the Zapon Division of the Atlas Powder Co., who will talk on Post-War Planning of Organic Finishes and Organic Finishing to Government Specifications.

A letter from W. L. Pinner, Supreme 3rd Vice President, regarding the exhibits and displays for the National Convention in June 1944 at Cleveland, Ohio, was turned over to F. J. Kalafus, chairman of the Exhibit Committee.

Ross A. Pringle, 103 Golden Hill St., Milford, Conn., Associate Member.

James McGrath, 557 Steamboat Road, Norwich, Conn., Associate Member.

Engraving of the First Prize for Branch Exhibits which was received by the Bridgeport Branch at the Buffalo convention in June 1943.

A new member, Charles Temple, was introduced to the members of the Branch by President A. R. McNeil.

A discussion was held with open comments to hold an open meeting at a future date in Stamford, Conn. It was decided to bring this subject up at the April business meeting. President A. R. McNeil reported that Mr. Jack Bain, our Publisher and Mr. E. T. Candee, our Executive Secretary and Editor will attend our meeting April 7, 1944. The Branch will be greatly honored to have them attend our meetings.

Bills against the Branch were ordered paid.

The treasurer's report was read and accepted.

Due to the absence of Librarian J. E. Charleson, President A. R. McNeil turned the Educational Session over to our expert on finishing problems, Dr. Walter R. Meyer, who conducted a round table discussion on the various problems of the Plating Industry. We might add with real sincerity that Doc Meyer certainly knows the answers.

J. G. STERLING, *Sec'y & Treas.*

AMENDMENTS TO THE CONSTITUTION

(SPONSORED BY NEWARK)

Newark Branch feels that in as much as they have been instrumental in effecting a considerable saving in the cost of printing the *Monthly Review* that the Society as a whole should benefit by this saving they propose the following amendment to the By-Laws. The said saving will more than compensate the proposed reduction in the Per Capita Tax.

Proposed Amendment: Section 3 of Article VI of Part I of the By-Laws shall read as follows:

> Amount of Per Capita Tax: Each Branch Society shall contribute a Per Capita Tax of thirty-five per cent (35%) to defray the expenses of the Supreme Society, etc.

The only change in this By-Law is the percentage of the Per Capita Tax, which at the present time is forty-five (45%) per cent.

This is for the consideration of all Branches, so that the delegates to the National Convention may be properly instructed.

GEORGE WAGNER, *Secretary*

(SPONSORED BY MONTREAL BRANCH)

Preamble

AMENDMENT #1:

This Society shall be known as the International Society of Electroplaters and Associates Inc., and incorporated under the laws of the State of New Jersey.

AMENDMENT #2:

If Amendment #1 is not satisfactory we beg to offer for the following amendment — "That the Society be known as the Society of Electroplaters and Associates," and incorporated under the laws of the State of New Jersey.

AMENDMENT #3:

If this does not meet the approval of the delegates in session we beg to offer for your approval the following: "That this Society shall be known as the American Society of Electroplaters and Associates" and incorporated under the laws of the State of New Jersey.

AMENDMENT #4:

We suggest that the word "body" replace the word "society" wherever the words "Supreme Society" is used.

ARTICLE II — *Membership*

AMENDMENT #5:

Section 1: Change from two classes to three — Honorary, Active and Associate.

AMENDMENT #6:

Section 2: Active Members — Change to 3 members. These shall consist of two active and one associate in good standing from each Branch of the Society which is also in good standing, who have been elected to the supreme body in the manner required in the By-laws.

Each Supreme Officer now sitting must be returned as one of the Branch Delegates.

ARTICLE IV — *Officers*

AMENDMENT #7:

Section 2: Drop the word "active."

ARTICLE VI — *Charters*

AMENDMENT #8:

Section 3(c): Change to new name.

PART II — Branch Societies

ARTICLE I — *Name* & *Object*

AMENDMENT #9:

Section 1: Change name.

ARTICLE II — *Membership*

AMENDMENT #10:

Section 1: Change to read "three classes — Honorary, Active and Associate."

AMENDMENT #11:

Section 2: Change to read: "These shall consist of applicants who have had not less than five years experience in the process of Electrodeposition of any type of metal. Elected by a majority vote. Each applicant shall be required to furnish proof. He may also be required to pass such examination as may be deemed advisable by the Branch. Once elected as an active member he shall have the right to retain this classification as long as he maintains his membership. Any member who through the old ruling of the Constitution lost his active membership may apply to his Branch for re-instatement to this class if he so desires.

AMENDMENT #12:

Section 3 — *Associate Members*: These shall consist of any persons not qualified for Active membership who are engaged in any phase of the Electroplating or Electrofinishing Industry and interested in the aims and welfare of this Society, and elected by a majority vote. Associate members shall have all the rights of an active member but in

only so far that only one can be elected each year to represent his Branch as a delegate to the Annual Convention.

AMENDMENT #13:

Section 4 — Drop this paragraph.

ARTICLE III — *Officers*

AMENDMENT #14:

Section 1 — Add also a third Vice President.

BY-LAWS

ARTICLE II — *Duties of Officers*

AMENDMENT #15:

Section 3(a): There should also be a third Vice President.

PAPERS TO BE READ AT THE 32nd ANNUAL CONFERENCE

Your Educational Program Chairman, John Honnecker reports that the following papers will be presented during the session in Cleveland next June. This does not comprise the completed list since all details were not finished at the time this list was prepared. Additional papers will appear in the complete program to appear in our next issue.

ELECTRO-FORMING by *Frank Savage*, Conn Instrument Company, Elkhart, Ind.

* * *

RESEARCH REPORT by *Dr. William Blum*, Bureau of Standards.

* * *

PLASTICS AND PLATING ON PLASTICS, *Harold Narcus*, Chief Chemist Plating Processes Company.

* * *

HARD CHROME PROBLEMS, *Art Logozzo*. There will be a 45 minute clinic after the paper to answer specific questions and help with actual problems.

* * *

INDIUM, one of the engineers of the process lincensors will discuss recent applications to alloy plating.

* * *

ALLOY PLATING, *Chemist Diggin* from Hanson Van Winkle-Munning and another authority from Westinghouse will collaborate on this subject.

* * *

POROUS CHROME, presented by the Van Der Horst Company.

* * *

A RAPID DETERMINATION OF COPPER IN NICKLE PLATING SOLUTIONS by *B. K. Knapp*, Research Laboratory of International Nickle Co.

* * *

THE RELATIONSHIP OF DEFECTS IN ELECTROPLATE TO THE GAS CONTENT OF THE BASIS METAL, *Charles L. Faust*, Batelle Memorial Institute.

* * *

CONTINUOUS STRIP PLATING, *Dr. Swaldhiem*, Du Pont Company.

* * *

A STUDY OF THE REACTIONS IN NICKLE DEPOSITION, *Dr. Waite-McGean* Chemical Company.

The above list plus such papers as are under consideration point toward a highly informative and profitable Conference.

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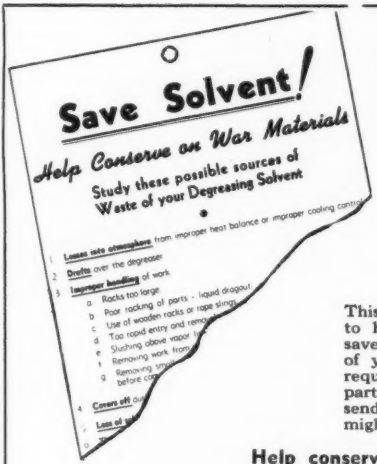
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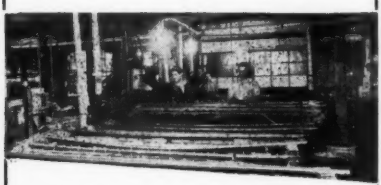

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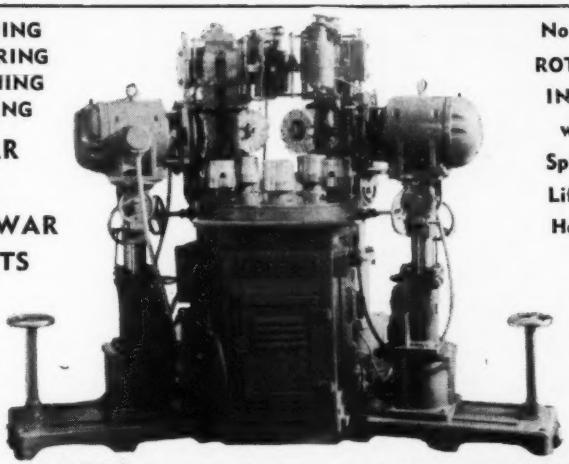

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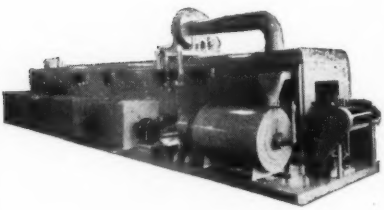

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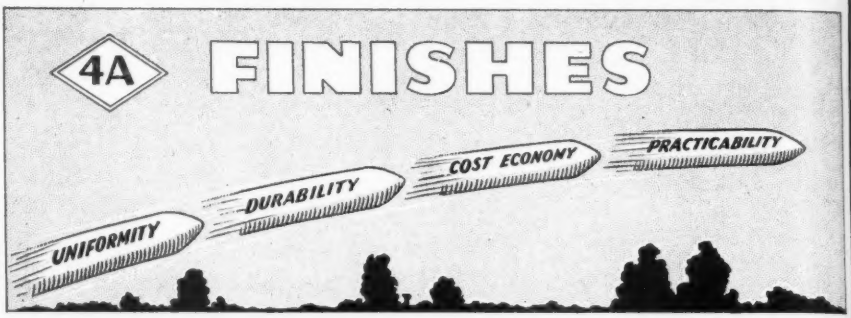

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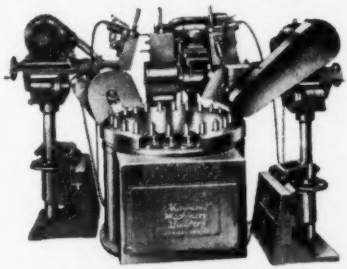

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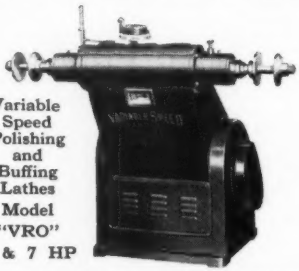

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MEMBERSHIP CHART

BRANCH	May 1943	Change in Membership	Percent Change
HARTFORD	72	+39½	+54.8
ST. LOUIS	77	+34	+44.1
BRIDGEPORT	78	+24	+30.7
SPRINGFIELD	62	+17½	+28.2
BUFFALO	63	+16	+26.1
GRAND RAPIDS	88	+22	+25.
PITTSBURGH	55	+13	+23.6
PROV.-ATTLEBORO	54	+11½	+21.2
INDIANAPOLIS	60	+12½	+20.8
DEROIT	280	+55	+19.6
CHICAGO	278	+47	+16.8
SAN FRANCISCO	33	+ 5½	+16.6
CINCINNATI	55	+ 9	+16.3
TORONTO	95	+14	+14.7
NEWARK	174	+24	+13.7
TOLEDO	37	+ 5	+13.5
NEW YORK	139	+17	+12.2
BOSTON	117	+13	+11.1
CLEVELAND	104	+11½	+11.
BALT.-WASHINGTON	98	+ 9	+ 9.1
WATERBURY	105	+ 8½	+ 8.
PHILADELPHIA	132	+ 6½	+ 5.6
MONTREAL	50	+ 2½	+ 5.
MILWAUKEE	93	+ 3½	+ 4.7
LOS ANGELES	117	+ 5	+ 4.2
DAYTON	96	+ 3	+ 3.1
*JACKSON-LANSING	51	—	—
SYRACUSE	46	— 1	— 2.1
ROCHESTER	86	— 2½	— 2.9
NEW HAVEN	103	— 4½	— 4.3
LANCASTER	43	— 3	— 6.9
ANDERSON	30	— 5½	—18.3

MEMBERSHIP MAY 1, 1943	= 2920
MEMBERSHIP MAY 1, 1944	= 3383
GAIN IN MEMBERSHIP	= 463
Per Cent of Gain 15.8%	

*Jackson-Lansing Branch was formed in February but this is the first month membership has been reported. Subsequent months will carry figures in the membership and percentage change columns.

BOOK DEPARTMENT

BOOK REVIEWS

By

DR. GEORGE DUBPERNELL, *United Chromium, Inc.*

"The Physical Chemistry of Electrolytic Solutions." Herbert S. Harned and Benton B. Owen. 607 pages. Reinhold Publishing Corporation, New York, December, 1943. Price $10.00.

The title of this book should be read carefully. Its emphasis is on "Physical Chemistry" rather than on "Electrolytic Solutions" as the average practical electrochemist knows them. It seems to contain almost no readily available information of interest or utility to a chemist connected with electrodeposition research. It is almost entirely of a special theoretical and mathematical nature and contains very little descriptive matter. The reviewer did not note a single explanatory line drawing or photograph of a piece of equipment used in making the measurements discussed.

The authors are professors of chemistry at Yale University. They apparently feel that the Debye-Huckel interionic attraction theory of electrolytic solutions is sufficiently well established and worthwhile to warrant a book of this size elaborating it and its application to the explanation and correlation of measurements of various properties of solutions of electrolytes such as conductance, transference, viscosity, diffusion, electromotive force, etc. The interionic attraction theory can perhaps be described as a modern modification of the older Arrhenius theory of ionization. Unless one has facility with mathematics and has studied advanced courses on the theory of solutions during about the last ten years in one of our larger universities, it would appear difficult or impossible to read this book. The terms used are seldom defined, and much of the language is that of one of the many highly developed special fields of modern physical chemistry, which tends to make the subject matter inaccessible to the average chemist.

The book is introduced by a five page Preface and also a fifteen page Glossary of Symbols to unify and assist the mathematical treatment which is emphasized throughout. The Preface begins with the statement that "The science of solutions is very complex." The reference to "—— its clarification ——" as an accomplished fact in the next sentence does not seem justified. The Glossary of Symbols also begins by referring to "—— The complexity of the subject ——." In the Preface, the authors review a considerable number of fields which they have not attempted to cover. They state that "—— Since we have devoted ourselves principally to the electrostatic theory and properties of ions in solutions, little attention has been paid to electrode processes, ——." They admit that

their presentation may have made certain parts "—— somewhat tiresome" and "tedious" for continuous reading.

This is a book written by specialists for other specialists in what seems to be a relatively narrow field. With this purpose in mind the authors have very greatly minimized the historical treatment of the subject, and there seems to be no reference to the books on "Theories of Solutions" which appeared about twenty-five to fifty years ago. Likewise, no reference was noted to R. W. Gurney's "Ions in Solution," of 1936, or G. Kortum's "Elektrolytlosungen" ("Electrolytic Solutions") of 1942 or 1943. Similarly, in the part of the book on experimental methods, "—— No apparatus or experimental technique is described in detail." This leaves the authors free to devote their attention to the development of the theory, and its application to the interpretation of experimental results.

The book is divided into three parts of five chapters each. The first five chapters are theoretical, cover 134 pages, and are headed as follows: General Thermodynamic Introduction, Interionic Attraction Theory, Thermodynamic Properties, Theory of Irreversible Processes, and Numerical Compilations. The second five chapters are presented in 191 pages and relate to experimental methods. The headings are: Investigation of Irreversible Processes, Coulomb Forces and Ion Association, Thermochemical Quantities, Activity and Osmotic Coefficients, The Thermodynamics of Galvanic Cells. The last five chapters comprise 210 pages and relate to the properties of electrolytes. They are: Hydrochloric Acid, Strong 1-1 Electrolytes in Aqueous Solution, Polyvalent Electrolytes in Aqueous Solution, Mixtures of Strong Electrolytes, and Properties of Weak Electrolytes. Extensive tables of experimental and calculated results follow in an Appendix of 48 pages. This is no doubt a useful feature to workers in this field. There is also an author index, and a subject index which has the unusual feature of including the chemical compounds discussed in various places in the book.

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BALTIMORE-WASHINGTON meets at the Telford Buffeteria, 14th and Decatur Sts., N.W. Washington, D. C., the first Saturday of each month. Secretary-Treasurer, Abner Brenner, 6509 Fulton St., Chevy Chase, Md.

BOSTON meets at the Hotel Statler, Boston, Mass., first Thursday each month. Secretary, A. W. Garrett, 35 Rosemont St., Dorchester, Mass.

BRIDGEPORT meets first Friday of each month at Chamber of Commerce Rooms, Stratfield Hotel. Secretary-Treasurer, Joseph G. Sterling, 134 Colony St., Bridgeport 8, Conn.

BUFFALO meets second Friday of each month at Hotel Statler, Buffalo, N. Y. Secretary J. C. Mays, 8436 W. Riversbore Dr., Niagara Falls, N. Y.

CHICAGO meets second Friday of each month at 8 p.m., Atlantic Hotel, 316 S. Clark St. Secretary, J. W. Hanlon, 3004 N. Whipple St., Chicago 18, Ill.

CINCINNATI meets on fourth Thursday of each month at 8 p.m., at Hotel Gibson, Cincinnati, Ohio. Secretary-Treasurer, Elliott W. Horning, 2425 Kenilworth Ave., Norwood 12, Ohio.

CLEVELAND meets first Saturday of each month at Cleveland Hotel. Secretary-Treasurer, G. B. Svenson, c/o Platers Supply Co., 2059 Hamilton Ave., Cleveland 14, Ohio.

DAYTON meets second Friday of each month at the Engineers Club, Dayton, Ohio. Secretary-Treasurer, W. M. Durnbaugh, R. R. 4 Xenia, Ohio.

DETROIT meets the first Friday of each month at the Hotel Statler. Secretary-Treasurer, F. L. Clifton, 16536 Inverness, Detroit 21, Mich.

GRAND RAPIDS meets second Friday of each month, 7:30 p.m., at the Rowe Hotel. Secretary-Treasurer, C. E. Abel, 11 Scribner Ave., N.W., Grand Rapids 4, Mich.

HARTFORD meets third Monday of each month alternately at Hartford Electric Light Company, Hartford and at the Elks Club, corner South and Main Sts., Bristol, Conn. Special meetings are held at the New Britain Trade School, New Britain, Conn. Secretary-Treasurer, Savin Zavarella, 84 Darlin St., East Hartford 8, Conn.

INDIANAPOLIS meets at the Hotel Riley, the first Wednesday of each month. Secretary-Treasurer, Donald L. Patrick, 3145 North Illinois St., Indianapolis 8, Ind.

JACKSON meets second Tuesday of each month alternating between Hotel Porter at Lansing and Hotel Hayes at Jackson. Secretary-Treasurer, C. E. Topping, Hayes Industries, Jackson, Mich.

LANCASTER meets second Friday of each month at 8 p.m., at Thaddeus Stevens Industrial School, Lancaster, Pa. Secretary-Treasurer, W. H. Fordney, 603 Marietta Ave., Lancaster, Pa.

LOS ANGELES meets the second Monday of each month, 6:30 p.m. at the Rosslyn Hotel, corner Fifth and Main Sts. Secretary-Treasurer, C. C. McLaren, 2236 Charnwood Avenue, Los Angeles, Calif.

MILWAUKEE meets first Friday of each month at Republican Hotel. Secretary-Treasurer, James Durnford, 2370 N. 32nd St., Milwaukee 10, Wis.

MONTREAL meets first Monday of each month at Mount Royal Hotel, Montreal, Quebec, Canada. Secretary-Treasurer, W. G. Finlay, 5670 16th Ave., Rosemount, Montreal.

NEWARK meets first and third Friday of each month at Hotel Robert Treat, Newark, N. J., at 8 p.m. Secretary-Treasurer, George Wagner, 113e So. Long Ave., Hillside, N. J.

NEW HAVEN meets the first Tuesday of each month at Sterling Chemistry Laboratory, Yale University. Secretary-Treasurer, B. J. Gaffney, 40 Filbert St., Spring Glen, Hamden 14, Conn.

NEW YORK meets second and fourth Fridays of each month, in the Hotel Pennsylvania, 7th Ave. and 33rd St., New York City, N. Y. Secretary-Treasurer, Franklyn MacStoker, 25 Princeton St., Garden City, L. I., N. Y.

PHILADELPHIA meets fourth Friday of each month, in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, Paul Mentzer, Sr., 7242 Bingham St., Philadelphia 11, Pa.

PITTSBURGH meets first Thursday of each month, at 6:30 p.m. at the Fort Pitt Hotel, Pittsburgh, Pa. Secretary-Treasurer, Frank Keller, 1102 Hiland Ave., Coraopolis, Pa.

PROVIDENCE-ATTLEBORO meets the third Monday of each month at the Providence-Biltmore Hotel. Secretary-Treasurer, Chas. C. Chace, 11 Friendly Road, Cranston 10, Rhode Island.

ROCHESTER meets second Friday of each month at the Hotel Seneca, Rochester, N. Y. Secretary-Treasurer, Donald C. Blum, 672 Mt. Read Blvd., Rochester, N. Y.

SAN FRANCISCO meets the last Thursday of each month, usually at Angelo's, 4307 San Pablo Avenue, Oakland, Calif. Secretary-Treasurer, Arthur Kistler, 15th and Vermont Sts., San Francisco, Calif.

SPRINGFIELD meets the fourth Monday of each month at the Hotel Charles. Secretary-Treasurer, D. S. Hartshorn, Jr., 76 Edendale St., Springfield 4, Mass.

ST. LOUIS meets first Friday of each month at Central Y. M. C. A., 16th and Locust Sts., Secretary-Treasurer, C. T. McGinley, 8319 Garfield, St. Louis, County 14, Mo.

SYRACUSE meets second Friday of each month at Bowne Hall, Syracuse University, Syracuse, N. Y. Secretary, Neil Maffei, 216 Woodland Ave., Syracuse, N. Y.

TOLEDO meets first Thursday of each month, in Room 201, of the Hilcrest Hotel, Toledo, Ohio. Secretary, Gaston Bergeman, 718 Howland St., Fremont, Ohio.

TORONTO meets second Friday of each month at Royal York Hotel. Secretary-Treasurer, E. B. Creighton, 468 Deloraine Ave., Toronto, Ont., Canada.

WATERBURY meets second Friday of the month at Elton Hotel. Secretary-Treasurer, Spencer L. Henn, Apothecaries Hall Co., Waterbury 88, Conn.

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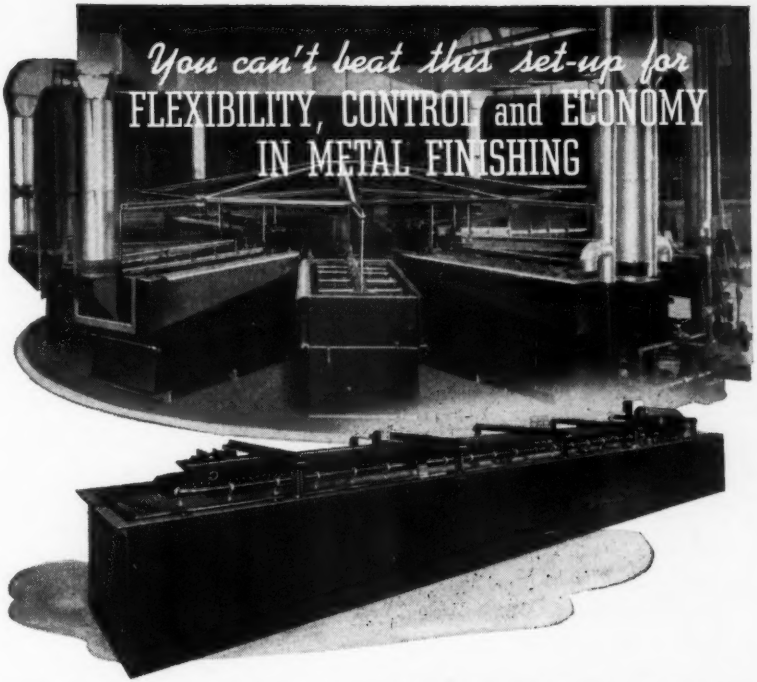

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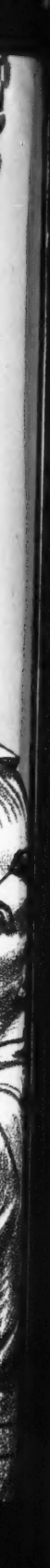

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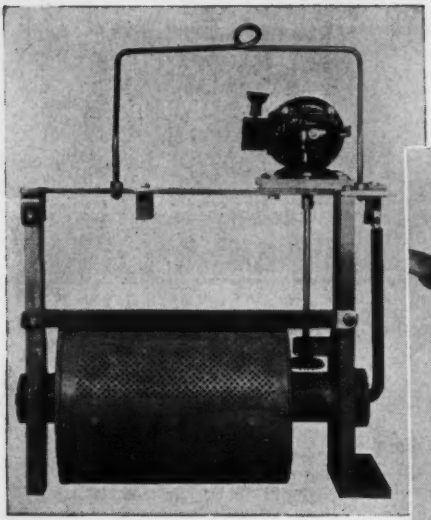

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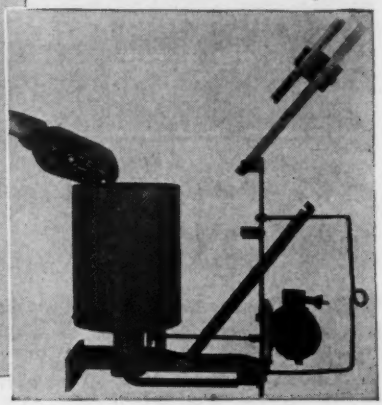

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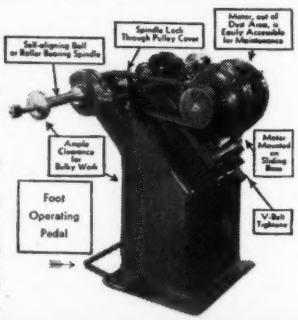
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